

Final Examinations

on Algebra and Statistics



Model 1

Answer the following questions :

1 Choose the correct answer from those given :

- 1 The point $(-3, 4)$ lies in the quadrant.
 (a) first (b) second (c) third (d) fourth
- 2 The positive square root of mean of the squares of deviations of values from its arithmetic mean is called
 (a) the range. (b) the arithmetic mean.
 (c) the standard deviation. (d) the mode.
- 3 If $3a = 4b$, then $a : b =$
 (a) $3 : 4$ (b) $4 : 3$ (c) $3 : 7$ (d) $4 : 7$
- 4 If $n(X) = 2$, $n(Y^2) = 9$, then $n(X \times Y) =$
 (a) 6 (b) 18 (c) 11 (d) 7
- 5 The range of the set of the values : 7, 3, 6, 9 and 5 is :
 (a) 3 (b) 4 (c) 6 (d) 12
- 6 If $y \propto x$ and $y = 2$ when $x = 8$, then $y = 3$ when $x =$
 (a) 16 (b) 12 (c) 24 (d) 6

2 [a] If $X \times Y = \{(2, 2), (2, 5), (2, 7)\}$

, find : 1 Y 2 $Y \times X$

[b] If a, b, c and d are proportional, prove that : $\frac{a}{b-a} = \frac{c}{d-c}$

3 [a] If $X = \{2, 3, 5\}$, $Y = \{4, 6, 8, 10\}$ and R is a relation from X to Y where

" $a R b$ " means " $2a = b$ " for all $a \in X, b \in Y$

- 1 Write R and represent it by an arrow diagram.
- 2 Show that R is a function.

[b] Find the number that if we add it to each term of the ratio $7 : 11$ it becomes $2 : 3$

- 4 [a] If $X = \{1, 3, 5\}$ and R is a function on X , where $R = \{(a, 3), (b, 1), (1, 5)\}$, find :

1 The range of the function.

2 The value of $a + b$

- [b] If $y \propto \frac{1}{X}$ and $y = 3$ when $X = 2$

, find :

1 The relation between X and y

2 The value of y when $X = 1.5$

- 5 [a] Represent graphically the function $f : f(X) = (X - 3)^2$, $X \in [0, 6]$, from the graph deduce the vertex of the curve, the minimum value of the function and the equation of the axis of symmetry.

- [b] Calculate the arithmetic mean and the standard deviation of the set of values :
8, 9, 7, 6 and 5

Model 2

Answer the following questions :

- 1 Choose the correct answer from those given :

- 1 The point $(3, 4)$ lies in the quadrant.

(a) first

(b) second

(c) third

(d) fourth

- 2 is one of the measures of the dispersion.

(a) The median

(b) The arithmetic mean

(c) The standard deviation

(d) The mode

- 3 The third proportion of the two numbers 3 and 6 is

(a) $\frac{1}{2}$

(b) 9

(c) 2

(d) 12

- 4 If $n(X) = 2$, $n(Y \times X) = 6$, then $n(Y^2) = \dots\dots\dots$

(a) 4

(b) 9

(c) 16

(d) 12

- 5 The range of the set of the values : 7, 3, 6, 9 and 5 is

(a) 3

(b) 4

(c) 6

(d) 12

6 If $xy = 7$, then $y \propto \dots\dots\dots$

(a) $\frac{1}{x}$

(b) $x - 7$

(c) x

(d) $x + 7$

2 [a] If $X = \{2, 5\}$, $Y = \{1, 2\}$, $Z = \{3\}$

, find : 1 $n(X \times Z)$

2 $(Y \cap X) \times Z$

[b] If b is the middle proportional between a and c , prove that : $\frac{a-b}{a-c} = \frac{b}{b+c}$

3 [a] If $X = \{1, 3, 4, 5\}$, $Y = \{1, 2, 3, 4, 5, 6\}$ and R is a relation from X to Y where " $a R b$ " means " $a + b = 7$ " for all $a \in X, b \in Y$

1 Write R and represent it by an arrow diagram.

2 Show that R is a function.

[b] If $5a = 3b$, find the value of : $\frac{7a+9b}{4a+2b}$

4 [a] If $f(x) = 4x + b$ and $f(3) = 15$, find the value of : b

[b] If $y \propto x$, $y = 6$ when $x = 3$, find :

1 The relation between x and y

2 The value of y when $x = 5$

5 [a] Represent graphically the function $f : f(x) = 4 - x^2$, $x \in [-3, 3]$, from the graph deduce the vertex of the curve, the maximum value of the function and the equation of the axis of symmetry.

[b] The following frequency distribution shows the number of children of some families in a new city :

Number of children	0	1	2	3	4	Total
Number of families	6	15	40	25	14	100

Calculate the mean and the standard deviation of the number of children.

Model for the merge students

Answer the following questions :

1 Complete :

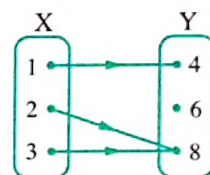
- 1 The point (5 , 3) lies in quadrant.
- 2 $n : n(X) = X^3 + 8$ is called a polynomial of degree.
- 3 The range of the set of the values : 4 , 14 , 25 and 34 is
- 4 If $y = 2X$, then $y \propto$
- 5 If $X = \{2 , 4 , 6\}$, then $n(X^2) =$
- 6 If $(a , 3) = (6 , b)$, then $a + b =$

2 Choose the correct answer from those given :

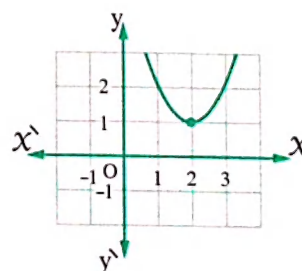
- 1 If $XY = 7$, then $y \propto$
 (a) $\frac{1}{X}$ (b) $X - 7$ (c) X (d) $X + 7$
- 2 If 2 , 3 , 6 and X are proportional , then $X =$
 (a) 9 (b) 18 (c) 12 (d) 3
- 3 If $2a = 5b$, then $\frac{a}{b} =$
 (a) $\frac{-5}{2}$ (b) $\frac{-2}{5}$ (c) $\frac{2}{5}$ (d) $\frac{5}{2}$
- 4 is one of the measures of the dispersion.
 (a) The arithmetic mean (b) The range
 (c) The mode (d) The median
- 5 If $n(X) = 5$, $n(X \times Y) = 10$, then $n(Y) =$
 (a) 4 (b) 3 (c) 2 (d) 1
- 6 If $X = \{1\}$, then $X^2 =$
 (a) 1 (b) (1 , 1) (c) $\{(1 , 1)\}$ (d) $\{1\}$

3 Put (✓) or (X) :

- 1 If the function $f = \{(1, 3), (2, 4), (3, 3)\}$
 , then the domain of the function is $\{1, 2, 3\}$ ()
- 2 If $y \propto X$ and $y = 6$ when $X = 3$, then $y = 2$ when $X = 4$ ()
- 3 If $\sum (X - \bar{X})^2 = 36$ for a set of values whose number equals 9 , then $\sigma = 4$ ()
- 4 The intersection point of the straight line $f(X) = X + 2$
 with X -axis is the point $(-2, 0)$ ()
- 5 If $f : X \longrightarrow Y$, then X is called the domain of this function. ()
- 6 The arrow diagram from X to Y
 is a function. ()

**4 Join from column (A) to column (B) :**

(A)	(B)
1 If $(1, 4) \in \{2, X\} \times \{1, 4\}$, then $X = \dots\dots\dots$	• 6
2 If the function f where $f(X) = X - 4$ is represented graphically by a straight line passing through the point $(a, 2)$, then $a = \dots\dots\dots$	• 1
3 $\frac{1}{2} = \frac{3}{6} = \frac{4}{8} = \frac{\dots\dots}{16}$	• 10
4 If $f(X) = 5$, then $f(5) + f(-5) = \dots\dots\dots$	• ± 6
5 The middle proportional of the two numbers 4 and 9 is $\dots\dots\dots$	• 2
6 In the opposite figure : The equation of the line of symmetry is $X = \dots\dots\dots$	• 8





Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

- 1 If $(a + 3, b - 1) = (-2, 4)$, then $a + b = \dots\dots\dots$
 (a) 0 (b) 2 (c) 5 (d) 10
- 2 If $X - y = 5$, then $6X - 6y = \dots\dots\dots$
 (a) 30 (b) 11 (c) 1 (d) -1
- 3 If $X, 3, 4$ and 6 are proportional, then $X = \dots\dots\dots$
 (a) 0 (b) 1 (c) 2 (d) 3
- 4 $\{3\} \cup]3, 5] = \dots\dots\dots$
 (a) \emptyset (b) $\{3\}$ (c) $]3, 5]$ (d) $[3, 5]$
- 5 The positive square root of mean of the squares of deviations of the values from their arithmetic mean is called $\dots\dots\dots$
 (a) the range. (b) the standard deviation.
 (c) the median. (d) the mean.
- 6 If $X^2 = 25$, where $X \in \mathbb{Z}$, then $X = \dots\dots\dots$
 (a) 5 (b) -5 (c) ± 5 (d) -25

2 [a] If $X = \{2\}$, $Y = \{3, 4, 5\}$, find :

- 1 $X \times Y$ 2 $n(Y^2)$ 3 X^2

[b] If $\frac{a}{b} = \frac{3}{5}$, then find the value of : $\frac{7a + 9b}{4a + 2b}$ in the simplest form.

3 [a] If $y \propto \frac{1}{x}$ and $y = 3$, when $x = 2$, find :

- 1 The relation between y and x 2 The value of y when $x = 1.5$

[b] If $X = \{1, 3, 4, 5\}$, $Y = \{2, 3, 4, 5, 6\}$ and R is a relation from X to Y where " $a R b$ " means " $a + b = 7$ " for all $a \in X, b \in Y$ write R and represent it by an arrow diagram. Is R a function? Why?

4 [a] The following frequency distribution shows the ages of 10 children :

Ages in years	5	8	9	10	12	Total
Number of children	1	2	3	3	1	10

Calculate the standard deviation to ages in years.

[b] Graph the curve of the function $f : f(X) = X^2 + 2X - 4$, where $X \in [-4, 2]$

From the graph find :

1 The vertex of the curve.

2 The equation of the axis of symmetry.

5 [a] If b is the middle proportional between a and c , prove that : $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

[b] If $f(X) = X^2 - 2X$, $g(X) = X - 2$

1 Prove that : $f(2) = g(2)$

2 If $g(k) = 7$, find : the value of k

2

Giza Governorate



Answer the following questions :

1 Choose the correct answer :

1 If $X \in \mathbb{R}$ and $1 < X < 3$, then $(3X - 1) \in \dots\dots\dots$

(a) $]2, 8[$

(b) $[2, 8]$

(c) $]2, 8]$

(d) $\{2, 8\}$

2 The range of the set of the values : 7, 3, 6, 5, 9 is $\dots\dots\dots$

(a) 3

(b) 4

(c) 6

(d) 12

3 Half of the number $4^{20} = \dots\dots\dots$

(a) 2^{20}

(b) 2^{39}

(c) 2^{29}

(d) 4^{19}

4 If X, Y are two non empty sets and $n(X^2) = 4$, $n(X \times Y) = 6$, then $n(Y^2) = \dots\dots\dots$

(a) 4

(b) 9

(c) 16

(d) 12

5 If $a \times \frac{b}{3} = \frac{a}{3}$, then $b = \dots\dots\dots$

(a) $-a$

(b) 1

(c) $\frac{a}{3}$

(d) a

6 If $Xy = 7$, then $y \propto \dots\dots\dots$

(a) $\frac{1}{X}$

(b) $X - 7$

(c) X

(d) $X + 7$

2 [a] If $(X + 3, 9) = (5, y^2)$, then find : the value of each of X and y

[b] If $y \propto \frac{1}{X}$ and $y = 4$ when $X = 2$, then find :

1 The relation between X and y

2 The value of y when $X = 8$

3 [a] If $X = \{0, 1, 2, 3, 4, 5, 6\}$ and R is a relation on X "where $a R b$ " means " a double b " for all $a \in X, b \in X$

1 Write R as a set of ordered pairs and show if it is a function or not.

2 Is $2 R 4$?

3 Find the value of X if $6 R X$

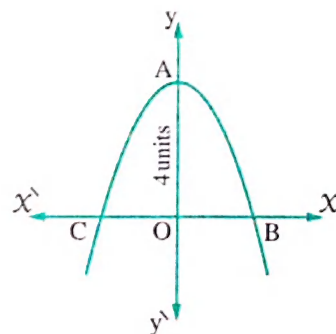
[b] If b is the middle proportional between a and c , then prove that : $\frac{a-b}{a-c} = \frac{b}{b+c}$

- 4 [a] The opposite figure represents the curve

of the function $f : f(x) = m - x^2$

If $OA = 4$ units, then find :

- 1 The value of m
- 2 The coordinates of the two points B and C
- 3 The area of the triangle whose vertices are A, B, C



- [b] If the function $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(x) = 2x + a$ and $f(3) = 9$, then find :

- 1 The value of a
- 2 The coordinates of the intersection point of the straight line representing the function with x -axis

- 5 [a] If $\frac{x}{2} = \frac{y}{3} = \frac{z}{4} = \frac{2x - y + 5z}{3m}$, then find : the value of m

- [b] Find the standard deviation of the values : 4, 8, 12, 10, 6



Answer the following questions : (Calculators are allowed)

- 1 Choose the correct answer from those given :

- 1 If $(3, 5) \in \{3, 6\} \times \{x, 8\}$, then $x = \dots\dots\dots$

(a) 8 (b) 6 (c) 5 (d) 3

- 2 A quarter of the number 2^8 is $\dots\dots\dots$

(a) 2^6 (b) 2^{10} (c) $\left(\frac{1}{2}\right)^8$ (d) $\left(\frac{1}{2}\right)^6$

- 3 If $\frac{3a}{5b} = \frac{1}{2}$, then $\frac{a}{b} = \dots\dots\dots$

(a) $\frac{6}{5}$ (b) $\frac{5}{6}$ (c) $\frac{2}{3}$ (d) $\frac{3}{2}$

- 4 If x is an odd number, then the next odd number directly is $\dots\dots\dots$

(a) x^2 (b) $x^2 + 1$ (c) $x + 1$ (d) $x + 2$

- 5 $\frac{\text{Sum of the values}}{\text{Their number}}$ is $\dots\dots\dots$

(a) the range. (b) the standard deviation.
(c) the mode. (d) the arithmetic mean.

- 6 If $3 > x > 1$, $x \in \mathbb{R}$, then $(3x - 1) \in \dots\dots\dots$

(a) $\{2, 8\}$ (b) $]2, 8[$ (c) $[2, 8]$ (d) $[2, 8[$

2 [a] If $X = \{2, 5\}$, $Y = \{1, 2\}$, $Z = \{3\}$

, find : 1 $n(X \times Z)$

2 $(Y \cap X) \times Z$

[b] Find the number which if its square is added to each of the two terms of the ratio 5 : 11 it becomes 3 : 5

3 [a] If $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$, find the value of : $\frac{2y - z}{3x - 2y + z}$

[b] If $X = \{1, 3, 4, 5\}$, $Y = \{1, 2, 3, 4, 5, 6\}$, and R is a relation from X to Y where " $a R b$ " means " $a + b = 7$ " for all $a \in X, b \in Y$, write the relation R and represent it by an arrow diagram. Is R a function ? and why ?

4 [a] If y varies inversely with x , $y = 2$ when $x = 4$, find :

1 The relation between y and x

2 The value of y when $x = 16$

[b] The following frequency distribution shows the ages of 20 persons :

Ages in years	15	20	22	23	25	30	Total
Number of persons	2	3	5	5	1	4	20

Calculate the standard deviation to ages.

5 [a] Represent graphically the function f where $f(x) = 4 - x^2$ taking $x \in [-3, 3]$ and from the drawing deduce :

1 The coordinates of the vertex of the curve.

2 The maximum or the minimum value of the function.

3 The equation of the symmetry axis

[b] If $f(x) = 5x - a$, $r(x) = x - 2a$ and $f(1) + r(3) = -7$, find : the value of a

4

El-Kalyoubia Governorate



Answer the following questions :

1 Choose the correct answer from the given answers :

1 If the point $(5, b - 7)$ lies on the x -axis, then $b = \dots\dots\dots$

(a) 2

(b) 5

(c) 7

(d) 12

2 If $f(x) = 7$, then $f(7) + f(-7) = \dots\dots\dots$

(a) 7

(b) -7

(c) -14

(d) 14

3 If $\sqrt[3]{-27} = -\sqrt{x}$, then $x = \dots\dots\dots$

- (a) 9 (b) -9 (c) 3 (d) -3

4 If $\frac{a}{3} = \frac{b}{4}$, then $8a - 6b + 4 = \dots\dots\dots$

- (a) 3 (b) 4 (c) 5 (d) 6

5 If $X = \{2\}$, then $X^2 = \dots\dots\dots$

- (a) 4 (b) $\{4\}$ (c) $(2, 2)$ (d) $\{(2, 2)\}$

6 The positive square root of the average of squares of deviations of the values from their mean is called $\dots\dots\dots$

- (a) the mean. (b) the range.
(c) the standard deviation. (d) the mode.

2 [a] If y varies inversely as x and $y = 3$ as $x = 2$

1 Find the relation between x and y

2 Find the value of y when $x = \frac{3}{2}$

[b] If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a - b + 5c}{3x}$, find : the value of x

3 [a] If $X = \{1, 3, 5\}$, $Y = \{2, 3, 4, 5, 6\}$ and R is a relation from X to Y , where " $a R b$ " means " $a + b = 7$ " for each $a \in X, b \in Y$

1 Write R and represent it by an arrow diagram.

2 Is R a function? and why?

[b] If b is the middle proportional between a and c , prove that : $\frac{a-c}{a-b} = \frac{b+c}{b}$

4 [a] If $X \times Y = \{(1, 1), (1, 3), (1, 5)\}$

Find : 1 X, Y

2 $Y \times X$

[b] Represent graphically the function $f : f(x) = 2 - x^2$ since $x \in [-3, 3]$

and find from the drawing deduce :

- 1 The coordinates of the vertex of the curve. 2 The maximum value of the function.
3 The equation of the symmetry axis.

5 [a] If $X = \{1, 3, 5\}$ and R is a function on X where $R = \{(a, 3), (b, 1), (1, 5)\}$, find :

1 The range of the function.

2 The numerical value of $a + b$

[b] Find the mean and the standard deviation for the following frequency distribution :

Set	Zero -	2 -	4 -	6 -	8 - 10	Total
Frequency	1	3	6	5	5	20

5

El-Sharkia Governorate



Answer the following questions : (Calculators are allowed)

1 Choose the correct answer from those given :

- 1 If $(X + 2, y) = (2, 3)$, then $X^5 y + 1 = \dots\dots\dots$
 (a) 3 (b) 2 (c) zero (d) 1
- 2 If $a \in X^2$ where $X = \{X : 5 < X < 7, X \in \mathbb{N}\}$, then a is $\dots\dots\dots$
 (a) 36 (b) $\{36\}$ (c) $(6, 6)$ (d) $[5, 7]$
- 3 If y varies directly as X , then $\dots\dots\dots$
 (a) X varies inversely as y (b) X varies directly as y
 (c) $y = X + 5$ (d) $\frac{X}{3} = \frac{2}{y}$
- 4 If $\frac{a}{b} = \frac{c}{d} = \frac{h}{m}$, then $\frac{a+c+h}{b+d+m} = \dots\dots\dots$
 (a) $\frac{a}{b} + \frac{c}{d} + \frac{h}{m}$ (b) $\frac{c}{h}$ (c) $\frac{c}{a}$ (d) $\frac{c}{d}$
- 5 If $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(X) = X^{k-2} + 3$ and $f(2) = 11$, then $k = \dots\dots\dots$
 (a) 5 (b) 3 (c) 2 (d) -3
- 6 If the range of the values $6+k, 6-k, 6+5k, 6-2k$ is 14 where $k \in \mathbb{N}$, then $k = \dots\dots\dots$
 (a) 1 (b) 2 (c) 3 (d) 4

2 [a] If $X = \{2, 3, 4\}$, $Y = \{3, 4, 5\}$, $Z = \{3, 4\}$, find :

- 1 $(Y \cap X) - Z$ 2 $X \times Z$ 3 $n(X \cup Z)$

[b] If a, b, c and d are in continued proportion, prove that : $\frac{2a^3 + 3b^3}{2a + 3d} = a^2$

3 [a] If $X = \{3, 4, 5\}$, $Y = \{1, 2, 3\}$ and R is a relation from X to Y where " $a R b$ " means that " $a + b$ is a prime number" for all $a \in X$ and $b \in Y$, write R and represent it by an arrow diagram. Is R a function or not? And why?

[b] If y varies inversely as \sqrt{X} , and $y = 3$ when $X = 9$, find X at $y = 4$

4 [a] Represent graphically the curve of the function $f : f(X) = (X - 2)^2 + 1$ where $X \in [\text{zero}, 4]$ From the graph find :

- 1 The equation of the axis of symmetry of the curve.
 2 The minimum value of the function.

[b] If $\frac{a}{4} = \frac{b}{3}$, find the value of : $\frac{ab + a^2}{ab - b^2}$

5 [a] Find the arithmetic mean and the standard deviation of the values : 6 , 3 , 9 , 2 , 5

[b] If the function $f : f(x) = x^{m-3} + x^{4-m}$ is a polynomial function where $m \in \mathbb{R}$

Find : 1 The value of $f(1)$

2 The value of m

6

El-Monofia Governorate



Answer the following questions : (Using calculator is permitted)

1 Choose the correct answer :

1 If $\frac{5}{4} + \frac{5}{x} = \frac{5}{2}$, then $x = \dots\dots\dots$

(a) 2

(b) 4

(c) 5

(d) $\frac{5}{2}$

2 If $x + y = xy = 5$, then $x^2y + xy^2 = \dots\dots\dots$

(a) 10

(b) 15

(c) 20

(d) 25

3 If $1 < x < 3$, $x \in \mathbb{R}$, then $(3x - 1) \in \dots\dots\dots$

(a) $[2, 8[$

(b) $[2, 8]$

(c) $]2, 8[$

(d) $\{2, 8\}$

4 If $\frac{a+2b}{a-b} = \frac{2}{3}$, then $\frac{b}{a} = \dots\dots\dots$

(a) $\frac{1}{8}$

(b) 8

(c) $-\frac{1}{8}$

(d) - 8

5 Which of the following values of the number x makes the range of the set of the values $x, 15, 20, 24$ equal to 14 ?

(a) 30

(b) 25

(c) 19

(d) 10

6 If $x \in \mathbb{R}_-$, then the point $(-x, \sqrt[3]{x})$ lies in the quadrant.

(a) first

(b) second

(c) third

(d) fourth

2 [a] If $X = \{4, 3\}$, $Y = \{5, 4\}$ and $Z = \{5, 6\}$, find :

1 $X \times (Y \cap Z)$

2 $(X - Y) \times Z$

3 $n(Z^2)$

[b] If a, b, c and d are in continued proportion , prove that : $\frac{ab - cd}{b^2 - c^2} = \frac{a + c}{b}$

3 [a] If $X = \{-2, -1, 1, 2\}$, $Y = \{8, \frac{1}{3}, -1, 1, -8\}$ and R is a relation from X to Y where " $a R b$ " means " $b = a^3$ " for each $a \in X, b \in Y$

1 Write R and represent it by an arrow diagram.

2 Show that R is a function and find its range.

[b] If the straight line that represents the function f where $f : \mathbb{R} \longrightarrow \mathbb{R}$

where $f(x) = ax + b$ cuts y -axis at the point $(0, 3)$ and $f(2) = 7$,

find : the values of a and b

- 4 [a] Find the number that if its square is added to the terms of the ratio 7 : 11 , then it will become 4 : 5

[b] If y varies inversely as X^2 and $X = 3$ when $y = 4$, find :

- 1 The relation between X and y 2 The value of X when $y = 9$

- 5 [a] Draw the curve of the function f where $f(X) = 1 - X^2$ taking $X \in [-3, 3]$ and from the graph find :

- 1 The coordinates of the vertex of the curve.
 2 The equation of the axis of symmetry.
 3 The area of the triangle whose vertices are the intersection points of the curve with the two axes.

[b] The following frequency distribution shows the number of children of some families in a new city :

Number of children	zero	1	2	3	4
Number of families	8	16	50	20	6

Calculate the mean and the standard deviation of the number of children.



Answer the following questions : (Calculators are allowed)

- 1 Choose the correct answer :

1 The function $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(X) = aX + b$ represents a linear function on condition $a \in \dots\dots\dots$

- (a) \mathbb{R} (b) \mathbb{R}_+ (c) $\mathbb{R} - \{0\}$ (d) \mathbb{R}_-

2 The fourth proportional of the numbers : 4 , 12 , 16 is

- (a) 24 (b) ± 24 (c) 48 (d) ± 48

3 If the weekly wages in pounds of a set of workers in a factory are 170 , 180 , 180 , 230 and 240 , then the median of wages equals

- (a) 200 (b) 70 (c) 180 (d) 205

4 If $X^2 + y^2 = 6$, $XY = 5$, then $(X + y)^2 = \dots\dots\dots$

- (a) 16 (b) ± 16 (c) 11 (d) ± 11

5 The relation which represents the direct variation between y and X is

- (a) $XY = 5$ (b) $y = 3 - X$ (c) $\frac{X}{3} = \frac{y}{5}$ (d) $\frac{X}{3} = \frac{4}{y}$

- 6 If $X = \{1, 3, 5\}$ and R is a function on X where $R = \{(a, 3), (b, 1), (1, 5)\}$, then the numerical value of $a + b = \dots\dots\dots$
- (a) 4 (b) 6 (c) 8 (d) other.

- 2 [a] If $X = \{-1, \text{zero}, 2, 3\}$, $Y = \{1, \text{zero}, \frac{1}{2}, \frac{1}{3}\}$ and R is a relation from X to Y where " $a R b$ " means "The number a is the multiplicative inverse of the number b " for each $a \in X, b \in Y$, write R , and represent it by an arrow diagram and show if R is a function or not? And why?

- [b] From the data of the following table answer the following questions :

x	2	4	6
y	6	3	2

- 1 Show the kind of variation between x and y
- 2 Find the constant proportional.
- 3 Find the value of y when $x = 3$

- 3 [a] If a, b, c and d are in continued proportion, prove that : $\frac{a}{b+d} = \frac{c^3}{c^2d+d^3}$

- [b] If $X = \{6\}$, $Y = \{2, 3\}$ and $Z = \{2, 5, 6\}$, find :

- 1 $n(X^2)$ 2 $(Z - Y) \times (X \cap Z)$

- 4 [a] Two integers the ratio between them is $2 : 3$, if you add to the first 7 and subtract from the second 12, the ratio between them becomes $5 : 3$, find the two integers.

- [b] If the function $f : f(x) = 3x - 6$ represents a straight line passing through the point $(a, 2a)$, find the value of a , and find the intersection point of the straight line with y -axis.

- 5 [a] Calculate the standard deviation for the following data :

16, 32, 5, 20, 27 rounding the result to one decimal place.

- [b] Represent graphically the function $f : f(x) = (x - 2)^2$, taking $x \in [-1, 5]$ and from the graph deduce :

- 1 The equation of the axis of symmetry.
- 2 The maximum value or the minimum value of the function.



Answer the following questions : (Calculator is permitted)

1 [a] Choose the correct answer :

- 1 The point $(X - 3, 2 - X)$ lies in the fourth quadrant , then $X = \dots\dots\dots$
 (a) 4 (b) 3 (c) 2 (d) 1
- 2 If $d(X) = cX + 8$, $d(2) = 0$, then $c = \dots\dots\dots$
 (a) 8 (b) 6 (c) 4 (d) - 4
- 3 If $a, 2, 4, b$ are in continued proportion , then $a + b = \dots\dots\dots$
 (a) 2 (b) 4 (c) 6 (d) 9

[b] If b is the middle proportion between a and c , prove that : $\frac{2c^2 - 3b^2}{2b^2 - 3a^2} = \frac{c}{a}$

2 [a] Choose the correct answer :

- 1 If $y \propto X$, $y \propto \frac{1}{d}$, then $y \propto \dots\dots\dots$
 (a) Xd (b) $\frac{d}{X}$ (c) $\frac{X}{d}$ (d) $X^2 d$
- 2 The standard deviation of the values $5, 5, 5, 5$ equals $\dots\dots\dots$
 (a) zero (b) 5 (c) 6 (d) 2
- 3 The function $d : d(X) = X^2 - (X - 3)^2$ is of the $\dots\dots\dots$ degree.
 (a) zero (b) first (c) second (d) third

[b] If $(-1, 2)$ is the point of the vertex of the curve of the function $d : d(X) = aX^2 - 6X + c$, find : the value of c

3 [a] If $3a = 4b = 6c$, find : $a : b : c$, and the value of : $\frac{3a + 2b}{a + 4c}$

[b] If $X = \{-2, -1, 0, 1, 2\}$, R is a relation on the set X where " $a R b$ " means " a is the additive inverse of the number b " for every $a \in X$ and $b \in X$, state R , then represent it by an arrow diagram , and mention giving reasons if R represents a function or not.

4 [a] If $X = z + 8$ where z varies inversely as y and $z = 2$ when $y = 3$, find the relation between y and X , then find : y when $X = 3$

[b] If $d(X) = 2X + 5$, $r(X) = X - 6$, prove that : $d(2) + 3r(3) = 0$

5 [a] Calculate the mean and the standard deviation of the following data : $5, 7, 8, 9, 6$

[b] If $(X - 2, 3^{y-1}) = (3, 1)$, find : X, y

9

Ismailia Governorate



Answer the following questions : (Calculators are allowed)

1 Choose the correct answer from those given answers :

1 $\sqrt{36} + \sqrt{16} = \dots\dots\dots$

(a) 10

(b) 24

(c) 52

(d) 100

2 The middle proportional between 3 , 27 is

(a) 9

(b) - 9

(c) ± 9

(d) 1

3 If $f(x) = 2$, then $f(2) + f(-2) = \dots\dots\dots$

(a) zero

(b) 4

(c) - 4

(d) 1

4 The positive number which twice its square equals 50 is

(a) 5

(b) 10

(c) 25

(d) 100

5 If $x + y = xy = 5$, then $x^2 y + y^2 x = \dots\dots\dots$

(a) 10

(b) 15

(c) 20

(d) 25

6 The simplest and easiest method of measuring dispersion is

(a) the range.

(b) the standard deviation.

(c) the arithmetic mean.

(d) the mode.

2 [a] If $X = \{2, 3, 5\}$, $Y = \{4, 6, 8, 10\}$ and R is a relation from X to Y where "a R b" means " $2a = b$ " for all $a \in X, b \in Y$

1 Write R and represent it by an arrow diagram.

2 Is the relation R a function ? Why ? and if it's a function , find its range.

[b] The ratio between two integers is 3 : 7 If 5 is subtracted from each of them , then the ratio becomes 1 : 3 , find the two integers.

3 [a] As Yousef was reading a book , he found out after 3 hours 50 pages remained , after 6 hours 20 pages remained. If there was a relation between the time (t) and the number of pages (y) Is a linear relation.

1 Represent the relation between (t) and (y) , then find the algebraic relation between them.

2 How much time did Yousef takes to finish reading the book ?

3 How many pages left when Yousef started reading ?

[b] If x, y, z and l are proportional quantities , prove that : $\frac{y-x}{x} = \frac{l-z}{z}$

- 4 [a] If $y \propto X$ and $y = 40$ at $X = 14$, find the relation between X and y , then find the value of X when $y = 80$

- [b] If $X \times Y = \{(1, 2), (1, 3), (2, 2), (2, 3)\}$, find : 1 $X \cup Y$

2 $n(Y^2)$

- 5 [a] Represent graphically the function $f : f(X) = (X - 2)^2$, taking $X \in [-1, 5]$
And from the graph find :

- 1 The coordinates of the vertex of the curve. 2 The equation of the line of symmetry.
3 The maximum or the minimum value of the function.

- [b] Find the standard deviation for the following set of values : 13, 14, 17, 19, 22

10

Suez Governorate



Answer the following questions : (Calculators are allowed)

- 1 Choose the correct answer from those given :

- 1 If $(2, 3) \in \{2, 5\} \times \{X, 6\}$, then $X = \dots\dots\dots$

(a) 6

(b) 5

(c) 3

(d) 2

- 2 $(\sqrt{5} - 3)(\sqrt{5} + 3) = \dots\dots\dots$

(a) 8

(b) 2

(c) 4

(d) -4

- 3 The positive square root of the mean of the squares of deviations of the values from their arithmetic mean is called

(a) the range.

(b) the arithmetic mean.

(c) the standard deviation.

(d) the mode.

- 4 If the number $\frac{3}{b} + 1 = 4$, then $b = \dots\dots\dots$ where $b \neq 0$

(a) 1

(b) 2

(c) 3

(d) 4

- 5 $\mathbb{Z}_- \cup \mathbb{N} = \dots\dots\dots$

(a) \emptyset (b) \mathbb{Z} (c) \mathbb{N} (d) \mathbb{R}

- 6 If $\frac{a}{b} = \frac{c}{d} = m$ (where $m \in \mathbb{R}^*$), then $\frac{ac}{bd} = \dots\dots\dots$

(a) m (b) m^2 (c) $2m$ (d) $2m^2$

- 2 [a] If $X = \{1, 2, 3\}$, $Y = \{1, 4, 6, 9\}$ and R is a relation from X to Y where " $a R b$ " means " $a = \sqrt{b}$ " for all $a \in X, b \in Y$

- 1 Find the relation R

- 2 Represent the relation R by an arrow diagram.

- 3 Is R a function? Why?

- [b] If b is the middle proportional between a and c , prove that : $\frac{2c^2 - 3b^2}{2b^2 - 3a^2} = \frac{c}{a}$

3 [a] If $(2x, 4) = (8, y + 1)$, find : $\sqrt{x^2 + y^2}$

[b] If $y \propto x$ and $y = 2$ when $x = 8$, find :

1 The relation between y and x

2 The value of y when $x = 12$

4 [a] Draw the curve of the function $f : f(x) = x^2 + 1$, taking $x \in [-2, 2]$ and from the graph find :

1 The coordinates of the vertex of the curve. **2** The equation of the axis of symmetry.

3 The minimum value.

[b] If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a - b + 5c}{3x}$, find : x

5 [a] If $X = \{1, 3, 5\}$ and R is a function on X where $R = \{(a, 3), (b, 1), (1, 5)\}$, find :

1 The range of the function. **2** The numerical value of the expression $a + b$

[b] Calculate the standard deviation for the values : 8, 9, 7, 6, 5



Answer the following questions :

1 Choose the correct answer from those given :

1 $[1, 3] - \{0, 1\} = \dots\dots\dots$

(a) $]1, 3[$ (b) $]1, 3]$ (c) $[1, 3[$ (d) $\{3\}$

2 If $2^x = 2^6$, then $x = \dots\dots\dots$

(a) 3 (b) 4 (c) 6 (d) 64

3 20% from 10 pounds = $\dots\dots\dots$ pounds.

(a) 2 (b) 2.5 (c) 5 (d) 20

4 If $n(X) = 3$, $n(X \times Y) = 12$, then $n(Y) = \dots\dots\dots$

(a) 4 (b) 9 (c) 15 (d) 36

5 If $3a = 4b$, then $a : b = \dots\dots\dots$

(a) 3 : 4 (b) 4 : 7 (c) 3 : 7 (d) 4 : 3

6 The range of the set of the values 7, 3, 6, 9 and 5 equals $\dots\dots\dots$

(a) 3 (b) 4 (c) 6 (d) 12

- 2** [a] If $X = \{2, 3, 4\}$, $Y = \{2, 3, 4, 5, 6, 7, 8\}$, R is a relation from X to Y where "a R b" means " $a = \frac{1}{2}b$ " for each $a \in X, b \in Y$, write R and represent it by an arrow diagram. Show that R is a function from X to Y and find its range.

[b] If $f(x) = 4x + b$ and $f(3) = 15$, find : the value of b

- 3** [a] If $f(x) = x^2 - 3x$, $g(x) = x - 3$

1 Find : $f(\sqrt{2}) + 3g(\sqrt{2})$ **2** Prove that : $f(3) = g(3) = 0$

[b] Represent graphically the quadratic function f where $f(x) = x^2, x \in \mathbb{R}$, consider $x \in [-3, 3]$, from the graph deduce the vertex of the curve, the minimum value of the function, the equation of the axis of symmetry.

- 4** [a] If b is the middle proportional between a and c , prove that : $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

[b] If $y \propto x$, where $y = 14$ when $x = 42$, then find :

1 The relation between x and y **2** The value of y when $x = 60$

- 5** [a] Calculate the standard deviation for the values : 16, 32, 5, 20, 27

[b] If the height of a right constant cylinder (constant volume) is (h) varies inversely as the square of its radius length r and $h = 27$ cm. when $r = 10.5$ cm., find h when $r = 15.75$ cm.

12

Damietta Governorate



Answer the following questions : (Calculators are allowed)

- 1** Choose the correct answer from the given ones :

1 If $n(X) = 3$, $n(Y^2) = 4$, then $n(X \times Y) = \dots\dots\dots$

(a) 6 (b) 12 (c) 18 (d) 36

2 The range of the set of the values 7, 4, 6, 9 and 5 equals $\dots\dots\dots$

(a) 3 (b) 4 (c) 5 (d) 6

3 If $\frac{y}{x} = 5$, then $y \propto \dots\dots\dots$

(a) x (b) $\frac{1}{x}$ (c) $x - 5$ (d) $x + 5$

4 If $\frac{3}{4} + \frac{3}{x} = \frac{3}{2}$, then $x = \dots\dots\dots$

(a) $\frac{3}{2}$ (b) 2 (c) 3 (d) 4

5 The third proportional of the two numbers 3 and 6 is $\dots\dots\dots$

(a) $\frac{1}{2}$ (b) 2 (c) 9 (d) 12

6 The solution set of the equation $(X - 1)^2 = 9$ in \mathbb{R} is

- (a) $\{4\}$ (b) $\{-2\}$ (c) $\{4, -2\}$ (d) $\{3\}$

2 [a] If $X = \{1, 9, 6\}$, $Y = \{3, 4, 5, 6\}$, $Z = \{4\}$, then find : $(X - Y) \times Z$

[b] If b is the middle proportional between a and c , prove that : $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

3 [a] If $y \propto \frac{1}{x}$ and $y = 3$ when $x = 2$

1 Find the relation between x and y

2 Find the value of y when $x = 1.5$

[b] If $\frac{y}{x-z} = \frac{x}{y} = \frac{x+y}{z}$, prove that :

1 Each ratio is equal to 2 (unless $x + y = 0$)

2 $3y = 2z$

4 [a] If $(x^3, y + 1) = (8, 3)$, find the value of : $\sqrt[3]{x + 3y}$

[b] If $X = \{-1, 0, 2, 3\}$, $Y = \{0, 1, 4, 6, 9\}$ and R is a relation from X to Y where " $a R b$ ", means " $a^2 = b$ " for each $a \in X, b \in Y$

1 Write R and represent it by an arrow diagram

2 Show that R is a function from X to Y and find its range.

5 [a] Calculate the arithmetic mean and the standard deviation of the set of values :
72, 53, 61, 70, 59

[b] Represent graphically the function $f : f(x) = x^2 - 2, x \in [-3, 3]$

From the graph deduce : 1 The vertex of the curve.

2 The equation of the axis of symmetry.

13

Kafr El-Sheikh Governorate



Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from those given :

1 If $X =]-\infty, 0[$, then $X^c = \dots\dots\dots$

- (a) \mathbb{R}_+ (b) $[0, \infty[$ (c) $]-\infty, 0]$ (d) \mathbb{R}_-

2 The function $f : f(x) = (x - 2)^2 - x^2$ is of the degree.

- (a) first (b) second (c) third (d) fourth

- 3 If $\sum (X - \bar{X})^2 = 36$ of a set of values and the number of these values = 9 , then $\sigma = \dots\dots\dots$

(a) 2 (b) 18 (c) 27 (d) 4

- 4 The middle proportional between $3X^3$ and $27X$ is $\dots\dots\dots$

(a) $9X^2$ (b) $\pm 9X^4$ (c) $\pm 9X^2$ (d) $9X^4$

- 5 If $y^2 + 4X^2 = 4Xy$, then $\dots\dots\dots$

(a) $y \propto X$ (b) $y \propto X^2$ (c) $y \propto \frac{1}{X}$ (d) $y \propto \frac{1}{X^2}$

- 6 If $\{2\} \times \{X, y\} = \{(2, 4), (2, 3)\}$, then $X - y = \dots\dots\dots$

(a) 1 (b) -1 (c) ± 1 (d) zero

- 2 [a] If $X = \{-1, 1, 2\}$, $Y = \{2, 4, 6, 8\}$ and R is a relation from X to Y , where "a R b" means "b = 2a + 4" for each $a \in X$, $b \in Y$, write R and represent it by an arrow diagram , and show if R is a function or not ? If R is a function mention its range.

- [b] If : $\frac{21X - y}{7X - z} = \frac{y}{z}$, prove that : $y \propto z$

- 3 [a] Represent graphically the function $f : f(X) = X^2 - 2X$, $X \in [-2, 4]$ and from the graph deduce :

- 1 The equation of the line of symmetry.
2 The maximum or the minimum value of the function.

- [b] If a , b , c and d are in continued proportion , prove that : $\frac{a}{b+d} = \frac{c^3}{c^2d + d^3}$

- 4 [a] If $\frac{X+y}{3} = \frac{y+z}{8} = \frac{z+X}{6}$, prove that : $\frac{X+y+z}{2X+3y+3z} = \frac{17}{50}$

- [b] If the point (a , 4) is one of the points of the function $g : \mathbb{R} \longrightarrow \mathbb{R}$ where $g(X) = 2X + b$, then find the value of : $6a + 3b$

- 5 [a] The following table represents the daily wages of a set of workers in a factory :

Set of wages	20 -	30 -	40 -	50 -	60 -	70 -
Number of workers	10	12	8	6	3	1

Find the mean and the standard deviation of the wages.

- [b] If the straight line which represents the function $f : \mathbb{R} \longrightarrow \mathbb{R}$, $f(X) = aX + b$ cuts from the positive part of y-axis 3 length units and passes through the point (1 , 5) , find : the value of each of a , b

14

El-Beheira Governorate



Answer the following questions : (Calculator is permitted)

1 Choose the correct answer from the given ones :

1 If $3^X = 9^2$, then $X = \dots\dots\dots$

- (a) 3 (b) 4 (c) 6 (d) 64

2 The range of the set of the values 7 , 3 , 6 , 8 and 5 equals $\dots\dots\dots$

- (a) 3 (b) 8 (c) 11 (d) 5

3 If the point $(X - 4, 2 - X)$ where $X \in \mathbb{Z}$ is located in the third quadrant , then $X = \dots\dots\dots$

- (a) 2 (b) 3 (c) 4 (d) 6

4 The relation which represents the direct variation between the two variables X and y is $\dots\dots\dots$

- (a) $XY = 7$ (b) $y = X + 5$ (c) $\frac{X}{3} = \frac{7}{y}$ (d) $\frac{X}{2} = \frac{y}{5}$

5 The solution set of the equation $X^2 - 25 = 0$ in \mathbb{R} is $\dots\dots\dots$

- (a) $\{5, -5\}$ (b) $[-5, 5]$ (c) 5 (d) -5

6 If $(3, 5) \in \{3, 6\} \times \{y, 8\}$, then $y = \dots\dots\dots$

- (a) 8 (b) 6 (c) 5 (d) 3

2 [a] If $X = \{2, 3, 5\}$, $Y = \{4, 6, 8, 10\}$ and R is a relation from X to Y where " $a R b$ " means " $2a = b$ " for all $a \in X, b \in Y$

1 Write R

2 Show that R is a function and find its range.

[b] If b is the middle proportional between a and c , then prove that : $\frac{2c^2 - 3b^2}{2b^2 - 3a^2} = \frac{c}{a}$

3 [a] If $y \propto \frac{1}{X}$ and $y = 9$ when $X = 2$, find :

1 The relation between y and X

2 The value of y when $X = 3$

[b] If $f(X) = 5X + a$ and $f(2) = 12$, find : the value of a

4 [a] If $X = \{3, 4\}$, $Y = \{4, 5\}$, $Z = \{6, 5\}$, find :

1 $(X - Y) \times Z$

2 $n(X \times Y)$

[b] Find the number that if subtracted thrice of it from each of the two terms of the ratio $\frac{49}{69}$ the ratio becomes $\frac{2}{3}$

5 [a] Calculate the mean and the standard deviation of the following data :

8 , 13 , 20 , 16 , 18 , 21

[b] Represent graphically the function f where $f(x) = 3 - x^2$, where $x \in [-3, 3]$ and from the graph deduce :

1 The equation of the symmetry axis.

2 The maximum value of the function.

15

El-Fayoum Governorate



Answer the following questions : (Using calculators is allowed)

1 Choose the correct answer :

1 If $(x + 1, \sqrt[3]{27}) = (-1, y)$, then the point (x, y) lies in the quadrant.

(a) first

(b) second

(c) third

(d) fourth

2 If $\frac{3}{4} + \frac{3}{x} = \frac{3}{2}$, then $x =$

(a) 2

(b) 4

(c) 3

(d) $\frac{3}{2}$

3 Twice of the number 2^8 is

(a) 2^{10}

(b) 2^{16}

(c) 2^4

(d) 2^9

4 If $xy = 12$, then y varies directly as

(a) $\frac{1}{x}$

(b) $x - 12$

(c) x

(d) $x + 12$

5 Omar bought 4 notebooks and 3 pens, he paid 50 pounds for them. If the price of a pen is twice the price of a notebook, then the price of a notebook is pounds.

(a) 4

(b) 5

(c) 10

(d) 20

6 If the range of the set of the values 7, x , 8, 9 and 5 is 6, then $x =$

(a) 3

(b) 4

(c) 6

(d) 12

2 [a] If $X = \{2, 5\}$, $Y = \{1, 2\}$, $Z = \{3\}$, find :

1 $n(X \times Y)$

2 $(Y \cap X) \times Z$

[b] If $a = 2b$, find the value of : $\frac{8a + 5b}{7a - 2b}$

3 [a] If $X = \{1, 2, 3\}$, $Y = \{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}\}$ and $R : X \longrightarrow Y$, where " $a R b$ " means " a is the multiplicative inverse of b " for all $a \in X, b \in Y$

1 Write R and represent it by an arrow diagram

2 Is R a function? Write its range.

[b] If $f(x) = 4x + a$, $f\left(\frac{1}{4}\right) = 12$, find : the value of a

4 [a] If a, b, c and d are in continued proportion, prove that : $\frac{a}{b+d} = \frac{c^3}{c^2 d + d^3}$

[b] If y varies inversely as X , and $y = 3$ when $X = 2$

1 Find the relation between X and y

2 Find the value of y when $X = 3$

5 [a] Graph the function f where $f(X) = 4 - X^2$, $X \in [-3, 3]$, from the graph determine :

1 The coordinates of the vertex of the curve.

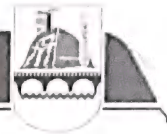
2 The equation of the symmetry axis of this function.

[b] Calculate the mean and the standard deviation of the following data :

3, 6, 7, 9, 15

16

Beni Suef Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 The middle proportional between a and c equals

(a) $\sqrt{a+c}$

(b) $\frac{a+c}{2}$

(c) $\pm\sqrt{ac}$

(d) ac

2 The difference between the greatest value and the smallest value of a set of data is called

(a) the range.

(b) the arithmetic mean.

(c) the mode.

(d) the standard deviation.

3 $|\sqrt[3]{-8}| = \dots\dots\dots$

(a) 4

(b) 2

(c) -2

(d) ± 2

4 $\frac{7}{X}$ is a rational number if $X \neq \dots\dots\dots$

(a) 7

(b) -7

(c) 1

(d) zero

5 If the point $(a, 3-a)$ lies on the X -axis, then $a = \dots\dots\dots$

(a) zero

(b) 3

(c) -3

(d) 5

6 If $-X > 3$, then $X \in \dots\dots\dots$

(a) $\{-3\}$

(b) $]3, \infty[$

(c) $]-\infty, 3[$

(d) $]-\infty, -3[$

2 [a] If $X = \{2, 5\}$, $Y = \{3, 2\}$, $Z = \{3\}$, find :

1 $X \times Z$

2 Y^2

3 $(X \cap Y) \times Z$

[b] Find the positive number which if we add its square to each of the two terms of the ratio 5 : 11 it becomes 3 : 5

3 [a] If $f(X) = X^2 - \sqrt{2}X$, $g(X) = X + 1$

1 Find : $f(3) + 3g(\sqrt{2})$

2 Prove that : $f(\sqrt{2}) = g(-1)$

[b] If y varies inversely with X and $y = 3$ when $X = 2$, find :

1 The relation between X and y

2 The value of y when $X = 1.5$

4 [a] If $X = \{1, 2, 3\}$, $Y = \{6, 7, 8\}$ and R is a relation from X to Y where " $a R b$ " means " $a + b = 8$ " for all $a \in X$ and $b \in Y$, write R and represent it by an arrow diagram. Is R a function? Why?

[b] If $\frac{X}{3} = \frac{y}{4} = \frac{z}{5}$, prove that : $\frac{2y - z}{3X - 2y + z} = \frac{1}{2}$

5 [a] Calculate the arithmetic mean and the standard deviation of the following values : 7, 16, 13, 9, 5

[b] Represent graphically the function $f : f(X) = X^2 - 2X$ where $X \in [-1, 3]$ and from the drawing deduce the equation of the axis of symmetry and the maximum or minimum value of the function.

17

El-Menia Governorate



Answer the following questions : (Calculators are allowed)

1 Choose the correct answer from the given ones :

1 $(\sqrt{7} - \sqrt{5})(\sqrt{7} + \sqrt{5}) = \dots\dots\dots$

(a) 2

(b) 12

(c) $2\sqrt{7}$

(d) $-2\sqrt{5}$

2 If $Xy = 3$, then $y \propto \dots\dots\dots$

(a) X

(b) $X - 3$

(c) $\frac{1}{X}$

(d) $X + 3$

3 $[1, 3] - \{0, 1\} = \dots\dots\dots$

(a) $]1, 3[$

(b) $]1, 3]$

(c) $[1, 3[$

(d) $\{3\}$

4 The arithmetic mean of the set of values 8, 9, 7, 6 and 5 equals $\dots\dots\dots$

(a) 5

(b) 2

(c) 3

(d) 7

5 20% of 10 pounds = $\dots\dots\dots$ pounds.

(a) 2

(b) 2.5

(c) 5

(d) 20

6 If the point $(X - 4, 2 - X)$ where $X \in \mathbb{Z}$ is located in the third quadrant, then $X = \dots\dots\dots$

(a) 2

(b) 3

(c) 4

(d) 6

2 [a] Find the standard deviation of the values : 6 , 8 , 10 , 12 and 14

[b] If $X = \{2, 5\}$, $Y = \{1, 2\}$, $Z = \{3\}$, find :

1 $n(X \times Z)$

2 $(Y \cap X) \times Z$

3 [a] If $y \propto \frac{1}{x}$ and $y = 3$ when $x = 2$, find :

1 The relation between x and y

2 The value of y when $x = 1.5$

[b] If $X = \{1, 3, 4, 5\}$, $Y = \{1, 2, 3, 4, 5, 6\}$ and R is a relation from X to Y where " $a R b$ " means " $a + b = 7$ " for each $a \in X$, $b \in Y$, write R and represent it by an arrow diagram. Show if R is a function from X to Y or not. Give the reason.

4 [a] If $\frac{x}{y} = \frac{2}{3}$, find the value of the ratio : $\frac{3x + 2y}{6y - x}$

[b] If the function $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(x) = 4x - a$ is represented graphically by a straight line intersecting the x -axis at the point $(2, b)$, find : a, b

5 [a] If b is the middle proportional between a and c , prove that : $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

[b] Represent graphically the following function and from the drawing deduce the coordinates of the curve , and the equation of the symmetry axis and the minimum or the maximum value of the function $f : f(x) = x^2 - 2$, where $x \in [-3, 3]$

18

Assiut Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer :

1 $[2, 5] \cup \{2\} = \dots\dots\dots$

(a) $]2, 5[$

(b) $[2, 5[$

(c) $] - \infty, \infty[$

(d) $[2, 5]$

2 $\sqrt{10^2 - 8^2} = \dots\dots\dots$

(a) 8

(b) 6

(c) 4

(d) 2

3 The solution set of the equation : $x(x - 1) = 0$ in \mathbb{R} is $\dots\dots\dots$

(a) $\{0\}$

(b) $\{1\}$

(c) $\{0, 1\}$

(d) \emptyset

4 If $3a = 8b$, then $a : b = \dots\dots\dots$

(a) $-8 : 3$

(b) $8 : 3$

(c) $3 : 8$

(d) $-3 : 8$

5 If $xy = 5$, then $y \propto \dots\dots\dots$

(a) $\frac{1}{x}$

(b) $x - 5$

(c) x

(d) $\frac{1}{y}$

6 If a regular die is thrown once, then the probability of appearance of an odd number is

(a) zero

(b) \emptyset

(c) 1

(d) $\frac{1}{2}$

2 [a] If $X = \{1, 5, 6\}$, $Y = \{2, 4, 5\}$, find $X \times Y$ and represent it by an arrow diagram.

[b] Represent graphically the quadratic function $f : f(x) = x^2 - 1$, $x \in [-2, 2]$, from the graph deduce :

1 The equation of the axis of symmetry.

2 The maximum value or the minimum value of the function.

3 [a] If $f(x) = 4x + m$, $f(3) = 15$, find : the value of m

[b] If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a - b + 5c}{3x}$, then find : the value of x

4 [a] If $y \propto x$, $y = 3$ when $x = 2$, find :

1 The relation between y , x

2 The value of y when $x = \frac{1}{3}$

[b] If b is the middle proportional between a and c , then prove that : $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

5 [a] If $X = \{1, 3, 5\}$, $Y = \{2, 3, 4, 6\}$ and R is a relation from X to Y where " $a R b$ " means " $a + b = 7$ " for each $a \in X$, $b \in Y$

1 Write R and represent it by an arrow diagram.

2 Show if R is a function or not. If R is a function, find its range.

[b] Calculate the mean and the standard deviation for the values : 8, 9, 7, 6, 5

19

Souhag Governorate



Answer the following questions : (Calculators are allowed)

1 Choose the correct answer :

1 The simplest dispersion measure is

(a) the mean.

(b) the median.

(c) the range.

(d) the mode.

2 20% from 100 pounds = pounds.

(a) 5

(b) 10

(c) 15

(d) 20

3 $[3, 7] - \{3, 7\} = \dots\dots\dots$

(a) $[3, 7[$

(b) $]3, 7]$

(c) $]3, 7[$

(d) $[3, 7]$

- 4 The solution set of the equation : $X^2 - 9 = 0$ in \mathbb{R} is
- (a) $\{-3\}$ (b) $\{3\}$ (c) $\{-3, 3\}$ (d) \emptyset
- 5 If $n(X) = 5$, $n(X \times Y) = 10$, then $n(Y) = \dots\dots\dots$
- (a) 4 (b) 3 (c) 2 (d) 1
- 6 The relation representing the direct variation between the two variables y and X is
- (a) $XY = 5$ (b) $y = X + 3$ (c) $\frac{X}{3} = \frac{4}{y}$ (d) $\frac{X}{5} = \frac{y}{2}$

2 [a] If $\frac{X}{y} = \frac{3}{4}$, find the value of : $\frac{3X + y}{X + 5y}$

[b] If $X = \{1, 2, 3\}$, $Y = \{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{5}\}$ and R is a relation from X to Y where " $a R b$ " means " a is the multiplicative inverse of b " for all $a \in X$, $b \in Y$, write R and represent it by an arrow diagram. Is R a function ? Why ?

3 [a] If $X = \{4, 5, 7\}$, R is a function on X and $R = \{(a, 5), (b, 5), (4, 7)\}$, find :

- 1 The value of $a + b$ 2 The range of the function.

[b] Represent graphically the function $f : f(X) = 2 - X^2$, $X \in [-3, 3]$, from the graph deduce :

- 1 The coordinates of the vertex point of the curve.
2 The equation of the axis of symmetry.
3 The maximum value of the function.

4 [a] If b is the middle proportional between a and c , prove that : $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

[b] From the data of the following table , answer the following questions :

X	2	4	6
y	6	3	2

- 1 Show the kind of variation between y and X
2 Find the constant proportion.
3 Find the value of y when $X = 2\frac{2}{5}$

5 [a] If the point $(a, 3)$ is located on the straight line which represents the function $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(X) = 4X - 5$, find : the value of a

[b] Find the standard deviation of the set of the values : 15 , 19 , 20 , 21 , 25



Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from those given :

- 1** The ordered pair (x^2, y^2) , where $x \neq 0, y \neq 0$ lies in the quadrant.
 (a) first (b) second (c) third (d) fourth
- 2** The positive square root of mean of the squares of deviations of the values from their arithmetic mean is called
 (a) the range. (b) the median.
 (c) the standard deviation. (d) the mode.
- 3** If x and $x + 17$ are two prime numbers, then $x =$
 (a) 1 (b) 2 (c) 3 (d) 5
- 4** If $xy = 5$, then $y \propto$
 (a) x (b) $\frac{1}{x}$ (c) x^2 (d) $\frac{1}{x^2}$
- 5** If $X = \{3\}$, then $n(X^2) =$
 (a) 1 (b) 9 (c) $\{(3, 3)\}$ (d) 3
- 6** The ratio between the area of a square of side length l and the area of a square of side length $3l$ equals
 (a) 1 : 3 (b) 3 : 1 (c) 1 : 9 (d) 9 : 1

2 [a] If $X = \{1, 2, 3\}$, $Y = \{0, 1, 2, 3, 4\}$ and R is a relation from X to Y where " $a R b$ " means " $b - a = 1$ " for all $a \in X, b \in Y$, write R and represent it by an arrow diagram. Show that R is a function and write its range.

[b] If $\frac{a}{4} = \frac{b}{5} = \frac{c}{3}$, prove that : $\frac{a-b+c}{a+b-c} = \frac{1}{3}$

3 [a] If $y \propto x, y = \frac{5}{6}$ when $x = \frac{1}{6}$, write the relation between y and x , then find the value of x when $y = 15$

[b] If the point $(a, -a)$ lies on the straight line that represents the function $f : f(x) = x - 6$, find : the value of a

4 [a] If y is the middle proportional between x and z , prove that : $\frac{xz}{y(y+z)} = \frac{x}{x+y}$

[b] If $X = \{2, 3\}$, $Y = \{5\}$, $Z = \{4, 5\}$, find :

1 $(X - Y) \times Z$

2 $X \times (Y \cap Z)$

- 5 [a] Represent graphically the function $f : f(X) = (X - 3)^2$, $X \in [0, 6]$,
from the graph find :

- 1 The vertex of the curve. 2 The maximum or minimum value of the function.

- [b] Calculate the arithmetic mean and the standard deviation for the following data :
73 , 54 , 62 , 71 , 60

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Luxor Governorate



Answer the following questions :

- 1 Choose the correct answer :

- 1 $\frac{1}{3}$ of the number $3^4 = \dots\dots\dots$
(a) 3 (b) 3^2 (c) 3^3 (d) 2^3
- 2 If $n(X^2) = 4$, $n(X \times Y) = 6$, then $n(Y^2) = \dots\dots\dots$
(a) 12 (b) 9 (c) 6 (d) 3
- 3 $4, 6[\cap \{4, 6\} = \dots\dots\dots$
(a) $\{5\}$ (b) $[4, 6]$ (c) $\{4, 6\}$ (d) \emptyset
- 4 If X, y, z are in continued proportion , then $X = \dots\dots\dots$
(a) $\pm \sqrt{yz}$ (b) yz (c) $\frac{y^2}{z}$ (d) $\frac{y}{z}$
- 5 $\sqrt[3]{64} = \sqrt{\dots\dots\dots}$
(a) 2 (b) 16 (c) 8 (d) 4
- 6 If all the values are equal , then $\dots\dots\dots$
(a) $X - \bar{X} > 0$ (b) $X - \bar{X} < 0$ (c) $\bar{X} = 0$ (d) $\sigma = 0$

- 2 [a] If $X = \{2, 1\}$, $Y = \{4, 0\}$, $Z = \{4, 5, -2\}$, find :

- 1 $X \times Y$ 2 $(Y \cap Z) \times X$ 3 $n(Y^2)$

- [b] Find the number which if subtracted from the first term of the ratio 15 : 13 and added to the second term , then it becomes 3 : 4

- 3 [a] If $f(X) = 2X + a$, $g(X) = X^2 + a$ and if $f(2) + g(-4) = 30$, find : the value of a

- [b] If a , b , c and d are proportional quantities , prove that : $\frac{a+c}{b+d} = \frac{a^2+c^2}{ab+cd}$

- 4 [a] If $X = \{0, 1, 2, \frac{1}{2}\}$ and R is a relation on X where "a R b" means
"a is the multiplicative inverse of b" for each $a \in X$, $b \in X$, write R and represent it
by an arrow diagram. Is R a function or not ?

[b] If $y \propto x^3$ and $y = 64$ when $x = 2$, find :

- 1 The relation between x and y 2 The value of y when $x = \frac{1}{2}$

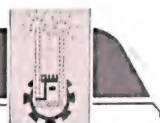
5 [a] Calculate the mean and the standard deviation for the values : 22 , 20 , 20 , 20 , 18

[b] Represent graphically the function $f : f(x) = x^2 - 4x + 5$ where $x \in [0, 4]$, then from the graph find :

- 1 The equation of the axis of symmetry.
2 The maximum or the minimum value of the function.

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Aswan Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer :

1 If $n(X^2) = 9$, $n(X \times Y) = 6$, then $n(Y) = \dots\dots\dots$

- (a) 2 (b) 3 (c) 4 (d) 6

2 If $xy = 3$, then $y \propto \dots\dots\dots$

- (a) $3x$ (b) $\frac{3}{x}$ (c) $\frac{1}{x}$ (d) $\frac{x}{3}$

3 $[2, 5] - \{2, 5\} = \dots\dots\dots$

- (a) $[1, 6]$ (b) \emptyset (c) $]2, 5[$ (d) $\{0\}$

4 $\sqrt{50} - \sqrt{8} = \dots\dots\dots$

- (a) $\sqrt{200}$ (b) $\sqrt{98}$ (c) $\sqrt{42}$ (d) $\sqrt{18}$

5 If $\sum (x - \bar{x})^2 = 48$ of a set of values and the number of these values = 12 , then $\sigma = \dots\dots\dots$

- (a) -2 (b) 2 (c) 4 (d) 6

6 If $x - y = 5$, $x + y = \frac{1}{5}$, then $x^2 - y^2 = \dots\dots\dots$

- (a) $\frac{1}{25}$ (b) 1 (c) 5 (d) 25

2 [a] If $X = \{1, 3, 4, 5\}$, $Y = \{1, 2, 3, 4, 5, 6\}$ and R is a relation from X to Y where " $a R b$ " means " $a + b = 7$ " for each $a \in X$, $b \in Y$

- 1 Write R and represent it by an arrow diagram.
2 Is R a function ? and why ?

[b] If $y \propto x$ and $y = 6$ when $x = 3$, find :

- 1 The relation between x and y 2 The value of y when $x = 5$

- 3 [a]** Represent graphically the function $f : f(x) = 4 - x^2$, taking $x \in [-3, 3]$ and from the graph deduce : the coordinates of the vertex point of the curve , the maximum value of the function and the equation of line of symmetry.
- [b]** Find the positive number which its square is added to the antecedent of the ratio $29 : 46$ and subtracted its square from its consequent the ratio becomes $3 : 2$

- 4 [a]** If the straight line which represents the function $f : \mathbb{R} \longrightarrow \mathbb{R}$, $f(x) = 6x - a$ intersects the y-axis at the point $(b, 2)$, find : the value of each of a and b
- [b]** The following frequency distribution shows the marks of a number of students in an exam :

Marks	0	1	2	3	4	5	6
Number of students	3	4	6	9	5	3	4

Find the standard deviation of the marks.

- 5 [a]** If $X = \{1, 3, 5\}$ and R is a function on X where $R = \{(a, 3), (b, 1), (1, 5)\}$, find :
- 1** The range of the function. **2** The value of $a + b$

- [b]** If a , b , c and d are proportional quantities , prove that : $\frac{a}{b-a} = \frac{c}{b-c}$



Answer the following questions : (Calculator is allowed)

- 1** Choose the correct answer from those given answers :
- 1** The next in the pattern : $\sqrt{3}, \sqrt{12}, \sqrt{27}, \sqrt{48}$ is
 (a) $\sqrt{50}$ (b) $\sqrt{75}$ (c) $\sqrt{60}$ (d) $\sqrt{90}$
- 2** The point $(-3, 4)$ lies in the quadrant.
 (a) first (b) second (c) third (d) fourth
- 3** If y varies inversely with x , and $x = \sqrt{3}$ when $y = \frac{2}{\sqrt{3}}$, then the constant proportional equals
 (a) $\frac{1}{2}$ (b) $\frac{2}{3}$ (c) 2 (d) 6
- 4** If the point $(a, 3)$ is located on the straight line which represents the function $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(x) = 4x - 5$, then a =
 (a) 2 (b) 3 (c) 4 (d) 5
- 5** is one of the measures of the dispersions.
 (a) The median (b) The arithmetic mean
 (c) The standard deviation (d) The mode

6 If $(X + 1)^2$ is one of the linear factors of the expression $(X^2 - 1)^2$, then the other factor is

- (a) $(X - 1)^2$ (b) $(X - 1)$ (c) $(X^2 + 1)$ (d) $(X^2 - 1)$

2 [a] If $X = \{2, 3, 5\}$, $Y = \{4, 6, 8, 10\}$ and R is a relation from X to Y where " $a R b$ " means " $2a = b$ " for all $a \in X, b \in Y$

1 Write R and represent it by an arrow diagram. 2 Show that R is a function.

[b] If $\frac{x}{y} = \frac{2}{3}$, find the value of the ratio : $\frac{3x + 2y}{6y - x}$

3 [a] If $X \times Y = \{(1, 1), (1, 3), (1, 5)\}$, then find :

- 1 X, Y 2 $Y \times X$ 3 Y^2

[b] If $\frac{21x - y}{7x - z} = \frac{y}{z}$, then prove that : $y \propto z$

4 [a] If $f(x) = 4x + b$ and $\frac{1}{3}f(3) = 5$, find : the value of b

[b] If a, b, c and d are in continued proportion, then prove that : $\frac{a^2 - 3c^2}{b^2 - 3d^2} = \frac{b}{d}$

5 [a] Calculate the standard deviation for the values : 12, 13, 16, 18, 21

[b] Represent graphically the function $f : f(x) = (x - 3)^2$, $x \in [0, 6]$, from the graph deduce the vertex of the curve, the minimum value of the function, the equation of the axis of symmetry.

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South Sinai Governorate



Answer the following questions :

1 Choose the correct answer from the given answers :

1 If $(2, 3) \in \{2, 5\} \times \{x, 4\}$, then $x = \dots\dots\dots$

- (a) 2 (b) 3 (c) 4 (d) 5

2 If $xy = 5$, then $y \propto \dots\dots\dots$

- (a) $\frac{1}{x}$ (b) x (c) $x - 5$ (d) $x + 5$

3 is one of the measures of the dispersions.

- (a) The arithmetic mean (b) The median
(c) The mode (d) The standard deviation

4 The mean of the values 1, 2, 3, 4 and 5 equals

- (a) 5 (b) 4 (c) 3 (d) 2

5 $\sqrt[3]{x^6} = \sqrt{\dots\dots\dots}$

(a) x^4

(b) x^3

(c) x^2

(d) x

6 If $\frac{5}{4} + \frac{5}{a} = \frac{5}{2}$, then $a = \dots\dots\dots$

(a) $\frac{5}{2}$

(b) $-\frac{5}{2}$

(c) 4

(d) -4

2 [a] If $X = \{1\}$, $Y = \{2, 3\}$, $Z = \{2, 5, 6\}$,

find : 1 $X \times (Y \cap Z)$

2 $n(X \times Y)$

3 $Z - Y$

[b] Represent graphically the function $f : f(x) = x^2 - 4$, $x \in [-3, 3]$, from the graph deduce the vertex of the curve, the minimum value of the function.

3 If $X = \{1, 3, 4, 5\}$, $Y = \{1, 2, 3, 4, 5, 6\}$ and R is a relation from X to Y where "a R b" means "a + b = 7" for all $a \in X$, $b \in Y$, write R , and represent it by an arrow diagram and also by a Cartesian diagram. Is R a function? and why?

4 [a] If $y \propto x$, $y = 6$ when $x = 3$, find the value of y when $x = 5$

[b] Find the positive number which if we add its square to each of the two terms of the ratio 5 : 11 it becomes 3 : 5

5 [a] If a, b, c and d are in continued proportion, then prove that : $\frac{c^2 - d^2}{a - c} = \frac{b d}{a}$

[b] The following frequency distribution shows the ages of 10 children :

Ages in years	5	8	9	10	12	Total
Number of children	1	2	3	3	1	10

Calculate the standard deviation to the ages in years.

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North Sinai Governorate



Answer the following questions : (Calculators are allowed)

1 Choose the correct answer from those given :

1 $\sqrt{16} + \sqrt[3]{-8} = \dots\dots\dots$

(a) -4

(b) -2

(c) 2

(d) 4

2 If $(9, 4) \in \{9, 7\} \times \{x, 5\}$, then $x = \dots\dots\dots$

(a) 9

(b) 4

(c) 7

(d) 5

3 If $x^2 - y^2 = 12$, $x + y = 4$, then $x - y = \dots\dots\dots$

(a) -3

(b) 3

(c) 4

(d) 12

- 4 The fourth proportional of the quantities 2 , 3 , 6 equals
 (a) 9 (b) 3 (c) 12 (d) 18
- 5 If $\frac{3}{4} + \frac{3}{x} = \frac{3}{2}$, then $x =$
 (a) 2 (b) 3 (c) $\frac{3}{2}$ (d) 4
- 6 The range of the set of the values 3 , 5 , 6 , 7 , 9 equals
 (a) 3 (b) 4 (c) 6 (d) 12

- 2 [a] If $X = \{2, 3, 4\}$, $Y = \{2, 3, 4, 5, 6, 7, 8\}$ and R is a relation from X to Y where "a R b" means " $a = \frac{1}{2} b$ " for all $a \in X$, $b \in Y$

- 1 Write R and represent it by an arrow diagram.
 2 Show that R is a function from X to Y and find its range.

[b] If $y \propto x$ and $y = 2$ when $x = 8$, find : the value of y when $x = 12$

- 3 [a] If $f(x) = 4x + b$, $f(3) = 15$, find : the value of b

[b] If $\frac{x}{y} = \frac{2}{3}$, then find the value of : $\frac{3x + 2y}{6y - x}$

- 4 [a] If $(6, b - 3) = (2 - a, -1)$, find : the value of $a + b$

[b] If b is the middle proportional between a and c , prove that : $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

- 5 [a] Calculate the arithmetic mean and the standard deviation of the set of the values : 23 , 12 , 17 , 13 , 15

[b] Graph the function $f : f(x) = 4 - x^2$ where $x \in [-3, 3]$ and from the graph find :

- 1 The vertex of the curve. 2 The equation of the axis of symmetry.
 3 The maximum value of the function.

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Red Sea Governorate



Answer the following questions : (Calculators are allowed)

- 1 Choose the correct answer from those given :

- 1 The range of the set of the values 7 , 3 , 6 , 9 , 5 equals
 (a) 3 (b) 4 (c) 6 (d) 12
- 2 If $x = 3$, $y = 5$, then $y^x =$
 (a) 243 (b) 125 (c) 15 (d) 8

3 The relation which represents the direct variation between the two variables X and y is

- (a) $XY = 5$ (b) $y = X + 3$ (c) $\frac{X}{3} = \frac{4}{y}$ (d) $\frac{X}{5} = \frac{y}{2}$

4 If $X - y = 5$, $X + y = 1$, then $X^2 - y^2 = \dots\dots\dots$

- (a) 5 (b) 4 (c) 25 (d) $\frac{1}{25}$

5 If $n(X^2) = 9$, then $n(X) = \dots\dots\dots$

- (a) 1 (b) 3 (c) 6 (d) 9

6 $[3, 5] -]3, 5[= \dots\dots\dots$

- (a) $[3, 5[$ (b) $\{3, 5\}$ (c) $\{3\}$ (d) $\{5\}$

2 [a] If $X \times Y = \{(2, 2), (2, 5), (2, 7)\}$, find :

- 1 Y 2 X^2

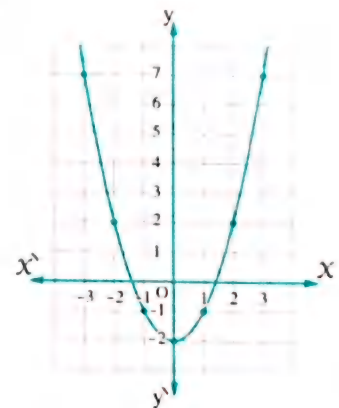
[b] If $5a = 3b$, find the value of : $\frac{7a + 9b}{4a + 2b}$

3 [a] If $y \propto \frac{1}{X}$ and $y = 3$ when $X = 2$, then find :

- 1 The relation between X and y 2 The value of y when $X = 1.5$

[b] The opposite figure represents the function $f : f(X) = X^2 - 2$, find :

- 1 The point of the vertex of the curve.
2 The equation of the line of symmetry.
3 The maximum or minimum value of the function.



4 [a] If $X = \{-2, -1, 0, 1, 2\}$, R is a relation on X where " $a R b$ " means

" a is the additive inverse of b " for each $a \in X$, $b \in X$, write R and represent it by an arrow diagram.

[b] If b is the middle proportion between a and c , prove that : $\frac{a-b}{a-c} = \frac{b}{b+c}$

5 [a] Represent graphically $f : f(X) = X - 3$, then find the points of intersection with X -axis and y -axis.

[b] Calculate the standard deviation for the values : 8 , 9 , 7 , 6 , 5



Answer the following questions : (Calculators are allowed)

1 Choose the correct answer from those given :

1 The relation which represents the inverse variation between the two variables X and y is

(a) $y = 5X$

(b) $y = \frac{1}{5}X$

(c) $y = \frac{5}{X}$

(d) $y = X + 5$

2 If $2^X = 4^3$, then $X = \dots\dots\dots$

(a) 3

(b) 4

(c) 6

(d) 46

3 $[1, 5] - \{0, 1\} = \dots\dots\dots$

(a) $]1, 5[$

(b) $]1, 5]$

(c) $[1, 5[$

(d) $\{5\}$

4 If the arithmetic mean of the set of the values $a, 5, 8, 7, 6$ equals 6, then $a = \dots\dots\dots$

(a) 4

(b) 6

(c) 8

(d) 30

5 If $\frac{3}{4} + \frac{3}{X} = \frac{3}{2}$, then $X = \dots\dots\dots$

(a) 2

(b) 4

(c) 3

(d) $\frac{3}{2}$

6 The linear function $f : f(X) = 2X - 1$ is represented by a straight line cutting y -axis at the point

(a) $(0, 1)$

(b) $(0, -1)$

(c) $(1, 0)$

(d) $(-1, 0)$

2 [a] If $X = \{13, 14, 43, 84\}$, and R is a relation on X such that " $a R b$ " means "the two numbers a and b have the same unit digit" for all $a \in X, b \in X$, write R and represent it by an arrow diagram. Is R a function? Why?

[b] If y varies as X and $y = 10$ when $X = 7$, find X when $y = 20$

3 [a] If $X = \{3, 4\}$, $Y = \{4, 5\}$, $Z = \{6, 5\}$, then find :

1 $X \times (Y \cap Z)$

2 $(X - Y) \times Z$

[b] If $\frac{X+y}{l+m} = \frac{y+z}{m+n} = \frac{z+X}{n+l}$, then prove that : $\frac{X}{l} = \frac{y-X}{m-l}$

4 [a] If $f : \mathbb{R} \longrightarrow \mathbb{R}$ is represented by a straight line cutting X -axis at $(3, b)$ where $f(X) = 2X - a$, find : " $3a + 5b$ "

- [b] The following is the frequency distribution for a number of defective units which are found in 100 boxes of manufactured units :

Number of defective units	zero	1	2	3	4	5
Number of boxes	3	16	17	25	20	19

Find the standard deviation to the defective units.

- 5 [a] If $\frac{a}{b} = \frac{2}{5}$, then find the value of : $\frac{b-a}{b+a}$

- [b] Represent graphically the function $f : f(x) = x^2 - 3$, $x \in [-3, 3]$ and from the drawing deduce the coordinates of the vertex of the curve , the equation of the symmetry axis and the minimum or the maximum value of the function.

Second

Trigonometry and Geometry



- 6 quizzes. 67
- Final revision. 71
- Final examinations : 78
 - School book examinations.
(2 model examinations + model for the merge students)
 - 27 governorates' examinations

Model 1

Answer the following questions :

1 Choose the correct answer from those given :

1 $\tan 45^\circ = \dots\dots\dots$

- (a) 1 (b) $2\sqrt{2}$ (c) $\frac{1}{2}$ (d) $\sqrt{2}$

2 If $\sin X = \frac{1}{2}$, X is an acute angle, then $m(\angle X) = \dots\dots\dots$

- (a) 45° (b) 60° (c) 30° (d) 90°

3 The distance between the two points $(3, 0)$ and $(0, -4)$ equals $\dots\dots\dots$ length units.

- (a) 4 (b) 5 (c) 6 (d) 7

4 If $X + y = 5$, $kX + 2y = 0$ are perpendicular, then $k = \dots\dots\dots$

- (a) -2 (b) -1 (c) 1 (d) 2

5 If $A(5, 7)$, $B(1, -1)$, then the midpoint of \overline{AB} is $\dots\dots\dots$

- (a) $(2, 3)$ (b) $(3, 3)$ (c) $(3, 2)$ (d) $(3, 4)$

6 The equation of the straight line which passes through the point $(3, -5)$ and parallel to y -axis is $\dots\dots\dots$

- (a) $X = 3$ (b) $y = -5$ (c) $y = 2$ (d) $X = -5$

2 [a] Without using calculator, prove that : $\sin 60^\circ = 2 \sin 30^\circ \cos 30^\circ$

[b] Prove that the points $A(-3, -1)$, $B(6, 5)$ and $C(3, 3)$ are collinear.

3 [a] If $4 \cos 60^\circ \sin 30^\circ = \tan X$, find the value of X , where X is the measure of an acute angle.

[b] If the midpoint of \overline{AB} is $C(6, -4)$ where $A(5, -3)$, find the point B

4 [a] If the straight line L_1 passes through the points $(3, 1)$, $(2, k)$ and the straight line L_2 makes with the positive direction of the X -axis an angle of measure 45° , find the value of k if $L_1 \parallel L_2$

[b] ABC is a right-angled triangle at C , $AC = 6$ cm., $BC = 8$ cm.

Find : 1 $\cos A \cos B - \sin A \sin B$

2 $m(\angle B)$

- 5 [a] Find the equation of the straight line whose slope is 2 and passes through the point (1, 0)
- [b] Prove that the points A (3, -1), B (-4, 6) and C (2, -2) which belongs to an orthogonal Cartesian coordinates plane lie on the circle whose centre is M (-1, 2). Find the circumference of the circle.

Model 2

Answer the following questions :

- 1 Choose the correct answer from those given :

- 1 $2 \sin 30^\circ \tan 60^\circ = \dots\dots\dots$
 (a) $\sqrt{3}$ (b) 3 (c) $\frac{\sqrt{3}}{3}$ (d) $\frac{1}{2}$
- 2 The equation of the straight line which passes through the point (-2, -3) and parallel to X-axis is $\dots\dots\dots$
 (a) $X = -2$ (b) $X = -3$ (c) $y = -2$ (d) $y = -3$
- 3 If $\cos X = \frac{\sqrt{3}}{2}$, X is the measure of an acute angle, then $\sin 2X = \dots\dots\dots$
 (a) 1 (b) $\frac{\sqrt{3}}{2}$ (c) -2 (d) $\frac{1}{\sqrt{3}}$
- 4 A circle of centre at the origin point and its radius length is 2 length units, which of the following points belongs to the circle?
 (a) (1, -2) (b) $(-2, \sqrt{5})$ (c) $(\sqrt{3}, 1)$ (d) (0, 1)
- 5 The perpendicular distance between the two straight lines : $X - 2 = 0$, $X + 3 = 0$ equals $\dots\dots\dots$ length units.
 (a) 1 (b) 5 (c) 2 (d) 3
- 6 If $\frac{-3}{2}$, $\frac{6}{k}$ are the slopes of two parallel straight lines, then k = $\dots\dots\dots$
 (a) 6 (b) -4 (c) $\frac{3}{2}$ (d) 2

- 2 [a] If $\cos E \tan 30^\circ = \cos^2 45^\circ$, find : m ($\angle E$), E is an acute angle.

- [b] Show the type of the triangle whose vertices are A (3, 3), B (1, 5) and C (1, 3) due to its side lengths.

- 3 [a] Find the equation of the straight line which passes through the points (1, 3) and (-1, -3) and prove that it is passing through the origin point.

- [b] If the point (3, 1) is the midpoint of (1, y), (X, 3), find the point (X, y)

4 [a] Find the equation of the straight line which intercepts from the two axes two positive parts of lengths 1 and 4 for x and y axes respectively and find its slope.

[b] ABC is a right-angled triangle at B , $AC = 10$ cm. and $BC = 8$ cm.

Prove that : $\sin^2 A + 1 = 2 \cos^2 C + \cos^2 A$

5 [a] Prove that the straight line which passes through the points $(-1, 3)$ and $(2, 4)$ is parallel to the straight line : $3y - x - 1 = 0$

[b] ABCD is a trapezium , $\overline{AD} \parallel \overline{BC}$, $m(\angle B) = 90^\circ$, $AB = 3$ cm. , $BC = 6$ cm. and $AD = 2$ cm.

Find : The length of \overline{DC} and the value of $\cos(\angle BCD)$

Model for the merge students

Answer the following questions :

1 Put (✓) or (X) :

- 1 The distance between the points $(9, 0)$, $(4, 0)$ equals 5 length units. ()
- 2 If $\tan E = 1$, then $m(\angle E) = 45^\circ$ ()
- 3 The straight line $y = 2x + 1$ intercepts a part of length -1 from y -axis ()
- 4 If $\overrightarrow{AB} \perp \overrightarrow{CD}$, then the slope of $\overrightarrow{AB} \times$ the slope of $\overrightarrow{CD} = 1$
(both of \overrightarrow{AB} and \overrightarrow{CD} aren't parallel to any axis) ()
- 5 $\tan 60^\circ = \frac{1}{\sqrt{3}}$ ()
- 6 If $A(1, 2)$, $B(3, 4)$, then the midpoint of \overline{AB} is $(2, 3)$ ()

2 Choose the correct answer from those given :

- 1 The distance between the point $(4, 3)$ and x -axis is length units.
(a) -3 (b) 3 (c) 4 (d) -4
- 2 $4 \cos 30^\circ \tan 60^\circ = \dots\dots\dots$
(a) 3 (b) $2\sqrt{3}$ (c) 6 (d) 12
- 3 If $x + y = 5$, $kx + 2y = 0$ are parallel , then $k = \dots\dots\dots$
(a) -2 (b) -1 (c) 1 (d) 2
- 4 The points $(0, 1)$, $(3, 0)$ and $(0, 4)$
(a) form a right-angled triangle. (b) form an acute-angled triangle.
(c) form an obtuse-angled triangle. (d) are collinear.
- 5 If $\overrightarrow{AB} \parallel \overrightarrow{CD}$ and the slope of $\overrightarrow{AB} = \frac{2}{3}$, then the slope of $\overrightarrow{CD} = \dots\dots\dots$
(a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) $-\frac{2}{3}$ (d) $-\frac{3}{2}$
- 6 If $\sin x = \frac{1}{2}$, x is the measure of an acute angle , then $\sin 2x = \dots\dots\dots$
(a) 1 (b) $\frac{1}{4}$ (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{1}{\sqrt{3}}$

3 Join from column (A) to column (B) :

(A)	(B)
1 The slope of the straight line which is parallel to X-axis is	• 10
2 $\sin^2 30^\circ + \cos^2 30^\circ = \dots\dots\dots$	• 0
3 If ABCD is a rectangle where A (-1, -4), C (5, 4), then the length of $\overline{BD} = \dots\dots\dots$ length units.	• 1
4 The equation of the straight line which passes through the origin point and its slope is 2 is $y = \dots\dots\dots X$	• -3
5 The equation of the straight line which passes through the point (2, -3) and parallel to X-axis is $y = \dots\dots\dots$	• 2
6 The value of : $\frac{2 \tan 30^\circ}{1 + \tan^2 30^\circ} = \dots\dots\dots$	• $\frac{\sqrt{3}}{2}$

4 Complete the following :

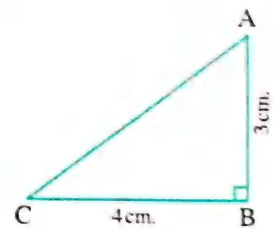
1 If $\overline{AB} \parallel \overline{CD}$ and the slope of $\overrightarrow{AB} = \frac{1}{2}$, then the slope of $\overrightarrow{CD} = \dots\dots\dots$

2 In the opposite figure :

ABC is a right-angled triangle at B

, AB = 3 cm. and BC = 4 cm.

, then $\sin C = \dots\dots\dots$



3 If the point (0, a) belongs to the straight line : $3x - 4y = -12$, then $a = \dots\dots\dots$

4 If $X \cos 60^\circ = \tan 45^\circ$, then $X = \dots\dots\dots$

5 The distance between the point (4, 3) and the origin point in the coordinates plane is

6 If the origin point is the midpoint of \overline{AB} where A (5, -2), then B (.....,))

1

Cairo Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given answers :

- 1 If $\sin X = \frac{1}{2}$, where X is the measure of an acute angle, then $X = \dots\dots\dots^\circ$
 (a) 30 (b) 45 (c) 60 (d) 90
- 2 The straight line whose equation is $y = 3X + 4$ intercepts from the positive part of y-axis a part of length $\dots\dots\dots$ length units.
 (a) 3 (b) 4 (c) 5 (d) 7
- 3 The measure of the exterior angle of an equilateral triangle equals $\dots\dots\dots^\circ$
 (a) 120 (b) 90 (c) 60 (d) 30
- 4 If $\triangle ABC \equiv \triangle XYZ$, then $AB = \dots\dots\dots$
 (a) BC (b) YZ (c) XZ (d) XY
- 5 The equation of the straight line whose slope equals 1 and passes through the origin point is $\dots\dots\dots$
 (a) $y = X + 1$ (b) $X = 1$ (c) $y = 1$ (d) $y = X$
- 6 The angle whose measure is 30° supplements an angle of measure $\dots\dots\dots^\circ$
 (a) 60 (b) 120 (c) 150 (d) 180

2 [a] Without using calculator, prove that :

$$4 \sin 45^\circ \cos 45^\circ = 2 \text{ (showing the steps of the solution).}$$

[b] Find the equation of the straight line which passes through the point (1, 2) and is parallel to the straight line whose equation is $y = 3X + 5$

3 [a] Find the value of X which satisfies that :

$$X \sin 30^\circ = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$$

[b] Prove that the straight line which passes through the points (0, 5), (3, 2) is perpendicular to the straight line which makes an angle of measure 45° with the positive direction of X-axis.

- 4 [a] ABCD is a parallelogram, M is the point of intersection of its diagonals where A (3, -1), C (1, 7) Find the coordinates of the point M
- [b] If A (2, 8), B (-1, 4) and C (3, 1) are the vertices of the triangle ABC, prove that :
- 1 The triangle ABC is a right-angled triangle at B
 - 2 The triangle ABC is an isosceles triangle.
- 5 [a] The triangle ABC is a right-angled triangle at B where AB = 7 cm. and BC = 24 cm. Find the value of :
- 1 $3 \tan A \times \tan C$
 - 2 $\sin^2 A + \sin^2 C$
- [b] If the points (0, 1), (a, 3) and (2, 5) are collinear, find the value of a

2

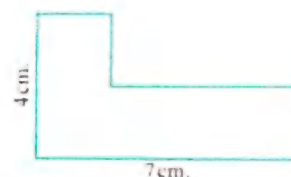
Giza Governorate



Answer the following questions :

1 Choose the correct answer :

- 1 The perimeter of the opposite figure equals cm.
- (a) 44 (b) 22
(c) 18 (d) 11
- 2 If $\angle X$, $\angle Y$ are two complementary angles and $\sin X = \frac{3}{5}$, then $\cos Y =$
- (a) $\frac{4}{5}$ (b) $\frac{3}{5}$ (c) $\frac{3}{4}$ (d) $\frac{5}{3}$
- 3 ABCD is a parallelogram and $m(\angle A) : m(\angle B) = 1 : 2$, then $m(\angle B) =$ °
- (a) 45 (b) 135 (c) 120 (d) 115
- 4 The straight line whose equation is : $y - 2x - 5 = 0$ cuts from the positive part of y-axis a part of length length units.
- (a) 2 (b) 5 (c) 7 (d) 10
- 5 In $\triangle ABC$, if the angles $\angle A$, $\angle B$ are complementary, then $m(\angle C) =$ °
- (a) 45 (b) 30 (c) 90 (d) 60
- 6 The slope of the straight line which makes with the positive direction of X-axis an angle whose positive measure is X° equals
- (a) $\sin X$ (b) $\cos X$ (c) $\frac{\sin X}{\cos X}$ (d) $\sin X + \cos X$



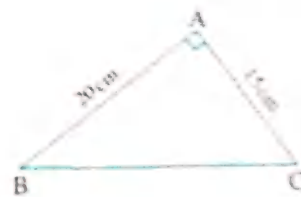
- 2 [a] ABCD is a trapezoid in which $\overline{AD} \parallel \overline{BC}$, $m(\angle B) = 90^\circ$ If AB = 3 cm., AD = 6 cm., BC = 10 cm., then prove that : $\cos(\angle DCB) - \tan(\angle ACB) = \frac{1}{2}$
- [b] If the straight line L_1 , passes through the points (3, 1), (2, k) and the straight line L_2 makes with the positive direction of X-axis an angle of measure 45° , then find the value of k which makes the two straight lines L_1 , L_2 parallel.

3 [a] In the opposite figure :

ABC is a triangle , $m(\angle A) = 90^\circ$, $AC = 15$ cm.

, $AB = 20$ cm.

Prove that : $\cos C \cos B - \sin C \sin B = 0$


[b] ABCD is a parallelogram its diagonals intersect at M where :

$A(3, -1)$, $B(6, 2)$, $C(1, 7)$

Find the coordinates of the two points M and D

4 [a] Without using calculator , find $m(\angle X)$ which satisfies the equation :

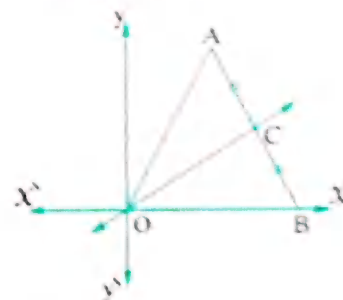
$\tan X = 4 \sin 30^\circ \cos 60^\circ$ where X is a positive acute angle.

[b] Find the equation of the straight line passing through the point $(3, 4)$ and perpendicular to the straight line $5x - 2y + 7 = 0$
5 [a] If the distance between the point $(a, 7)$ and the point $(0, 3)$ is equal to 5 length units, then find the value of a
[b] In the opposite figure :

AOB is an equilateral triangle

, C is the midpoint of \overline{AB}

Find the equation of \overline{OC} where O is the origin point.


3
Alexandria Governorate


Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from those given :

[1] If $C(6, -4)$ is the midpoint of \overline{AB} where $A(5, -3)$, then B is

(a) $(7, -5)$

(b) $(-5, -7)$

(c) $(-5, 7)$

(d) $(11, -7)$

[2] The measure of the angle that complements an angle of measure 60° is

(a) 120

(b) zero

(c) 30

(d) 90

[3] If $\sin \theta = 0.6$, then $m(\angle \theta) \approx$

(a) $51^\circ 33' 35''$

(b) $36^\circ 52' 12''$

(c) $47^\circ 15' 48''$

(d) $45^\circ 15' 6''$

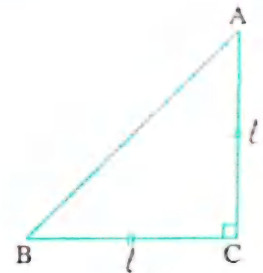
- 4 The square whose area is 100 cm^2 , then its diagonal length is cm.
 (a) 10 (b) 50 (c) $2\sqrt{10}$ (d) $10\sqrt{2}$
- 5 ABC is a right-angled triangle at B where A (1, 4), B (-1, -2), then the slope of \overrightarrow{BC} equals
 (a) $-\frac{1}{3}$ (b) 3 (c) $\frac{1}{3}$ (d) -3
- 6 The sum of the lengths of any two sides of a triangle is the length of the third side.
 (a) smaller than (b) equal to (c) greater than (d) twice

2 [a] In the opposite figure :

ABC is an isosceles triangle and right-angled at C
 and the length of each of its legs is l

Find : 1 The ratio between the lengths of the triangle
 sides AC : BC : AB

2 $\tan B$, $\sin A$



- [b] If the distance between the two points $(X, 5)$, $(6, 1)$ equals $2\sqrt{5}$ length units, find the values of X

3 [a] If the points A (3, 2), B (4, -3), C (-1, -2), D (-2, 3) are the vertices of a rhombus

, find : 1 The coordinates of the intersection point of its diagonals.

2 The area of the rhombus ABCD

- [b] Without using calculator, find the value of X (where X is the measure of an acute angle) which satisfies : $2 \sin X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$

4 [a] Find the equation of the straight line passing through the point (1, 2) and perpendicular to the straight line passing through the two points A (2, -3), B (5, -4)

- [b] Prove the following equality with indicating the steps : $\tan 60^\circ = \frac{2 \tan 30^\circ}{1 - \tan^2 30^\circ}$

5 [a] If the straight line L_1 passes through the two points (3, 1), (2, k) and the straight line L_2 makes with the positive direction of the X -axis an angle of measure 45° , find the value of k , if $L_1 \parallel L_2$

- [b] Prove that the points A (-2, 5), B (3, 3), C (-4, 2) are not collinear.



Answer the following questions :

1 Choose the correct answer :

1 If $\cos X = \frac{\sqrt{2}}{2}$ where X is the measure of an acute angle , then $\sin 2X = \dots\dots\dots$

- (a) $\frac{1}{\sqrt{2}}$ (b) $\frac{-\sqrt{2}}{2}$ (c) 1 (d) $\frac{2}{\sqrt{2}}$

2 The number of the axes of symmetry of the circle equals

- (a) zero (b) 1 (c) 2 (d) an infinite number.

3 If ABCD is a rectangle A (- 4 , - 1) , C (4 , 5) , then the length of $\overline{BD} = \dots\dots\dots$ length units.

- (a) 10 (b) 6 (c) 5 (d) 4

4 The perpendicular length between $X = 5$, $X + 3 = 0$ equals

- (a) 2 (b) 8 (c) - 8 (d) 5

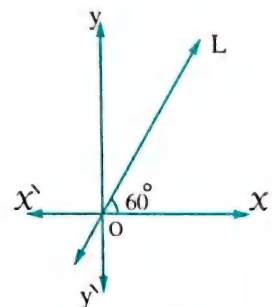
5 ΔABC is an isosceles triangle and right-angled at C and the length of each leg is l , then $AB : BC : CA = \dots\dots\dots$

- (a) $1 : 1 : \sqrt{2}$ (b) $1 : \sqrt{2} : 1$ (c) $\sqrt{2} : 1 : 2$ (d) $\sqrt{2} : 1 : 1$

6 In the opposite figure :

The equation of the straight line L is

- (a) $X = \sqrt{3} y$ (b) $y = \sqrt{3} X$
(c) $X = y$ (d) $y = \sqrt{3}$



2 [a] Find the slope and the length of the y-intercept for the straight line : $\frac{X}{2} + \frac{y}{3} = 1$

[b] If $\sin X = \tan 30^\circ \sin 60^\circ$ where X is the measure of an acute angle , find : $4 \cos X \sin X$

3 [a] Find the equation of the straight line which passes through the point (2 , - 5) and is parallel to the straight line which passes through the two points (- 2 , 1) , (2 , 7)

[b] ABC is a right-angled triangle at B , if $2 AB = \sqrt{3} AC$

Find : 1 $m(\angle C)$ 2 $\sin^2 A - \cos^2 C$

- 4 [a] If the two straight lines $L_1 : 3x - 4y - 3 = 0$, $L_2 : ay + 4x - 8 = 0$ are perpendicular , find the value of a

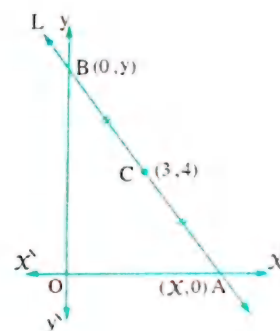
- [b] If the points $A(3, 2)$, $B(4, -3)$, $C(-1, -2)$, $D(-2, 3)$ are the vertices of a rhombus , find the area of the rhombus ABCD

- 5 [a] Prove that : $\cos^2 60^\circ = \cos^2 30^\circ \tan^2 30^\circ \tan^2 45^\circ$

- [b] In the opposite figure :

The point C is the midpoint of \overline{AB} where $C(3, 4)$

Find the perimeter of the triangle AOB



5

El-Sharkia Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

- 1 In $\triangle ABC$, if $m(\angle B) = 90^\circ$, then $\sin A + \cos C = \dots\dots\dots$

(a) $2 \sin C$ (b) $2 \cos A$ (c) $2 \cos C$ (d) $\tan A$

- 2 If $\sin 2x = \frac{1}{2}$ where $2x$ is the measure of an acute angle , then $x = \dots\dots\dots^\circ$

(a) 15 (b) 60 (c) 70 (d) 30

- 3 In the opposite figure :

If $AO = 8$ length units

, $OB = 6$ length units

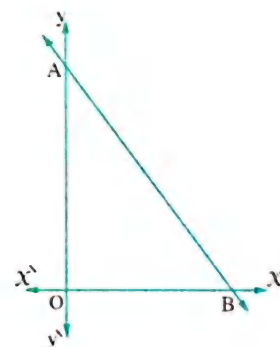
, then the equation of \overleftrightarrow{AB} is $\dots\dots\dots$

(a) $y = \frac{4}{3}x + 8$

(b) $y = -\frac{4}{3}x - 8$

(c) $y = \frac{3}{4}x - 8$

(d) $y = -\frac{4}{3}x + 8$



- 4 The perpendicular distance between the point $(3, -4)$ and x -axis equals $\dots\dots\dots$ length units.

(a) 3 (b) -4 (c) 5 (d) 4

5 In the square XYZL, if the slope of $\overline{XZ} = 1$, then the slope of $\overline{YL} = \dots\dots\dots$

- (a) 1 (b) -1 (c) ± 1 (d) 45°

6 ABC is a right-angled triangle at B, where $3 AC = 5 BC$, then $\tan A = \dots\dots\dots$

- (a) $\frac{3}{5}$ (b) $\frac{5}{3}$ (c) $\frac{3}{4}$ (d) $\frac{4}{3}$

2 [a] If the point C (4, y) is the midpoint of \overline{AB} where A (x, 3) and B (6, 5), find the value of : $x + y$

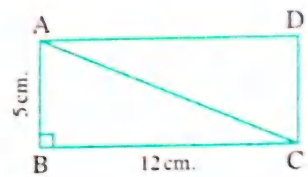
[b] Prove that the points A (5, 3), B (3, -2), C (-2, -4) are the vertices of a triangle, then prove that the triangle is an obtuse-angled triangle at B

3 [a] In the opposite figure :

If ABCD is a rectangle in which $AB = 5$ cm., $BC = 12$ cm.

, find : 1 The length of \overline{AC}

2 The value of : $5 \tan (\angle ACD) - 13 \sin (\angle DAC)$



[b] If the two points A (3, -1), B (5, 3)

, find the equation of the axis of symmetry of \overline{AB}

4 [a] Without using the calculator, find the value of : $\frac{\cos^2 60^\circ + \cos^2 30^\circ}{\sin 60^\circ \tan 60^\circ}$

[b] If the two equations of the two straight lines L_1 and L_2 are :

$L_1 : 6x + ky - 3 = 0$ and $L_2 : 3y = 2x + 6$ respectively.

, find the value of k which makes :

1 The two straight lines parallel.

2 The two straight lines perpendicular.

5 [a] Find the equation of the straight line which passes through the point (1, 4) and is parallel to the straight line : $x + 2y - 4 = 0$

[b] If ABCD is a square where : A (2, 4), B (-3, 0), C (-7, 5)

, find : 1 The coordinates of the point D 2 the area of the square ABCD

6

El-Monofia Governorate



Answer the following questions : (Using calculator is permitted)

1 Choose the correct answer :

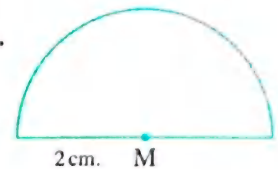
1 The surface area of a square is 25 cm^2 , then the length of its diagonal is cm.

- (a) 5 (b) 10 (c) $5\sqrt{2}$ (d) $10\sqrt{2}$

- 2 ABC is a triangle. If $(AC)^2 > (AB)^2 + (BC)^2$, then $\angle C$ is
 (a) acute. (b) obtuse. (c) right. (d) straight.

- 3 The opposite figure represents a semicircle with the radius length of its circle is 2 cm. , then the perimeter of this figure = cm.

- (a) 2π (b) 4π
 (c) $2\pi + 4$ (d) $4\pi + 2$



- 4 If $\cos \frac{X}{2} = \frac{\sqrt{3}}{2}$ where $\frac{X}{2}$ is the measure of an acute angle, then $\tan (X - 15^\circ) = \dots\dots\dots$

- (a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$ (c) 1 (d) $\frac{\sqrt{3}}{2}$

- 5 The equation of a straight line is : $\frac{X}{2} - \frac{y}{3} = 6$, then it intercepts from X-axis a part of length length units.

- (a) 3 (b) 12 (c) 6 (d) 18

- 6 If $-\frac{2}{3}$, $\frac{6}{k}$ are the slopes of two perpendicular straight lines, then k =

- (a) 4 (b) -9 (c) -4 (d) 9

- 2 [a] Determine the type of the triangle ABC where : A (3 , 0) , B (1 , 4) and C (-1 , 2) with respect to the lengths of its sides.

- [b] Without using calculator , prove that : $\frac{\tan 45^\circ + \tan 30^\circ}{1 - \tan 45^\circ \tan 30^\circ} = 2 + \sqrt{3}$

- 3 [a] ABCD is a quadrilateral where A (2 , 4) , B (-3 , 0) , C (-7 , 5) and D (-2 , 9)
Prove that : ABCD is a square.

- [b] ABC is a right-angled triangle at C , AC = 6 cm. and BC = 8 cm.

Find the value of : $\cos A \cos B - \sin A \sin B$

- 4 [a] Prove that the straight line which passes through the two points (-3 , -2) and B (4 , 5) is parallel to the straight line which makes with the positive direction of X-axis an angle its measure is 45°

- [b] If $\sqrt{3} \sin X \tan 30^\circ = \tan 45^\circ \cos 2X$, find the value of X (where X is the measure of an acute angle).

- 5 [a] Find the equation of the straight line which is perpendicular to the straight line : $3X - 4y + 7 = 0$ and intercepts from the positive part of y-axis a part of length 4 units.

- [b] ABCD is a rectangle in which AB = 3 cm. , AC = 5 cm.

Find : 1 m ($\angle ACB$)

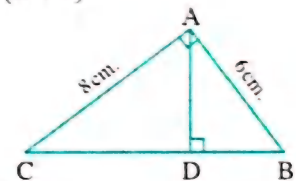
2 The area of the rectangle ABCD



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer :

- 1** The number of the axes of symmetry of the scalene triangle equals
 (a) zero (b) 1 (c) 2 (d) 3
- 2** In the triangle XYZ , if $(YZ)^2 + (XZ)^2 < (XY)^2$, then $\angle Z$ is
 (a) acute. (b) right. (c) obtuse. (d) straight.
- 3** If the distance between the two points (a , 0) and (0 , 1) is one length unit , then a =
 (a) 1 (b) - 1 (c) 0 (d) 2
- 4** If the origin point is the midpoint of \overline{AB} where A (2 , - 3) , then the point B is
 (a) (- 3 , 2) (b) (- 2 , 3) (c) (- 2 , - 3) (d) (2 , 3)
- 5** In the opposite figure : ABC is a right-angled triangle at A in which $\overline{AD} \perp \overline{BC}$ cutting it at D , AB = 6 cm. and AC = 8 cm. , then AD = cm.
 (a) 3.6 (b) 8.4 (c) 4.8 (d) 6.4
- 6** ABC is a right-angled triangle at B , then $\sin A + 2 \cos C =$
 (a) $2 \sin C$ (b) $3 \sin A$ (c) $2 \sin A$ (d) $3 \cos A$



- 2 [a]** XYZ is a right-angled triangle at Y in which : XY = 5 cm. and XZ = 13 cm.

Find the value of : $\cos X \cos Z - \sin X \sin Z$

- [b]** Find the measure of the positive angle that \overline{AB} makes where :
 A (3 , - 2) , B (6 , 1) with the negative direction of the X-axis.

- 3 [a]** Find the value of X if : $\cos (3X + 6^\circ) = \frac{1}{2}$ where $(3X + 6^\circ)$ is the measure of an acute angle.

- [b]** Find the equation of the straight line which is parallel to the straight line $\frac{y-1}{x} = \frac{1}{3}$ and intersects from the negative part of y-axis a part equals 3 length units.

- 4 [a]** Find the value of X which satisfies : $X - \sin 30^\circ \cos^2 45^\circ = \sin^2 60^\circ$

- [b]** If the points A (- 3 , 0) , B (3 , 4) and C (1 , - 6) are the vertices of an isosceles triangle of vertex A , find the length of the drawn line segment from A perpendicular to \overline{BC}

- 5** [a] If the point $M(-1, 2)$ is the centre of the circle passing through the point $A(3, -1)$, find the circumference of the circle (where $\pi = \frac{22}{7}$)
- [b] Find the equation of the straight line passing through the point $(1, 2)$ and perpendicular to the straight line passing through the two points $A(2, -3)$ and $B(5, -4)$

8

El-Dakahlia Governorate



Answer the following questions : (Calculator is permitted)

- 1** [a] Choose the correct answer :

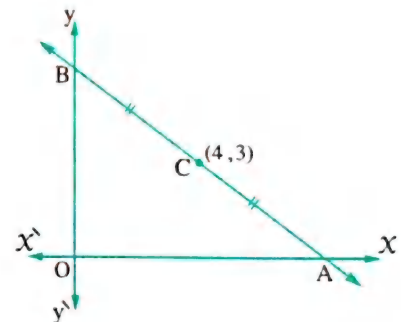
- 1** If $m(\angle A) = 75^\circ$, $\sin A = \cos B$, $\angle B$ is acute, then $m(\angle B) = \dots\dots\dots$
 (a) 45° (b) 75° (c) 15° (d) 105°
- 2** If ABC is a right-angled triangle at B , $AB = BC$, then $\tan A = \dots\dots\dots$
 (a) $\frac{1}{3}$ (b) $\sqrt{3}$ (c) 1 (d) $\frac{1}{\sqrt{2}}$
- 3** If $\overrightarrow{AB} \perp \overrightarrow{CD}$ and the slope of $\overrightarrow{AB} = 0$, then the slope of $\overrightarrow{CD} = \dots\dots\dots$
 (a) 1 (b) -1 (c) zero (d) not defined.

- [b] In the opposite figure :

The point C is the midpoint of \overline{AB}
 where $C(4, 3)$, O is the origin
 point in the perpendicular coordinates system.

Find : **1** The coordinates of the two points A, B

- 2** The area of the triangle AOB



- 2** [a] Choose the correct answer :

- 1** If $\cos 3X = \frac{1}{2}$, $3X$ is the measure of an acute angle, then $X = \dots\dots\dots$
 (a) 20° (b) 30° (c) 45° (d) 60°
- 2** The radius length of the circle whose centre is $(0, 0)$ and passes through $(3, 4)$ equals $\dots\dots\dots$ length units.
 (a) 7 (b) 1 (c) 12 (d) 5
- 3** The measure of the exterior angle of the equilateral triangle equals $\dots\dots\dots$
 (a) 60° (b) 90° (c) 120° (d) 80°

- [b] Without using calculator, find the value of X which satisfies :

$2 \sin X = \tan^2 60^\circ - 2 \tan 45^\circ$ where X is the measure of an acute angle.

3 [a] Find the equation of the straight line which intercepts from the positive parts of the two axes two parts of lengths 2 units , 3 units from X and y -axes respectively.

[b] ABC is a right-angled triangle at C , AC = 5 cm. , BC = 12 cm. Find the value of :
 $\cos A \cos B - \sin A \sin B$

4 [a] ABCD is a parallelogram where A (3 , 2) , B (4 , -5) , C (0 , -3)

Find the coordinates of the point at which the two diagonals intersect , then find the coordinates of the point D

[b] Without using calculator , prove that : $2 \sin 30^\circ + 4 \cos 60^\circ = \tan^2 60^\circ$

5 [a] Prove that A (5 , 1) , B (3 , -7) , C (1 , 3) are not collinear points.

[b] Find the equation of the straight line perpendicular to \overline{AB} from its midpoint where A (2 , 1) , B (4 , 5)

9

Ismailia Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 The parallelogram whose two diagonals are equal in length and perpendicular is the

(a) rectangle. (b) rhombus. (c) square. (d) trapezium.

2 If C is the midpoint of \overline{AB} where A (-3 , 6) , B (3 , -6) , then C =

(a) (6 , -6) (b) (0 , 0) (c) (3 , 3) (d) (-3 , 0)

3 The number of diagonals of the triangle equals

(a) 3 (b) 2 (c) 1 (d) 0

4 ABC is a triangle in which $m(\angle A) = 75^\circ$, $\sin B = \cos B$, then $m(\angle C) = \dots^\circ$

(a) 90 (b) 60 (c) 45 (d) 30

5 If the ratio between the measures of two adjacent supplementary angles is 1 : 2 , then the measure of the greater angle equals

(a) 120 (b) 90 (c) 180 (d) 60

6 The equation of the straight line which passes through the origin point and its slope = 3 is

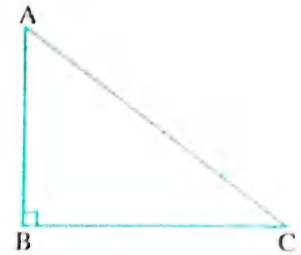
(a) $y = x$ (b) $y = 3$ (c) $x = 3$ (d) $y = 3x$

2 [a] In the opposite figure :

ABC is a right-angled triangle at B

Prove that : $\sin^2 A + \sin^2 C = 1$

- [b]** Prove that the straight line which passes through the two points $(-1, 3)$, $(2, 4)$ is parallel to the straight line whose equation is $3y - x - 1 = 0$



3 [a] In the opposite figure :

ABCD is a rectangle , $AB = 15$ cm. , $AC = 25$ cm.

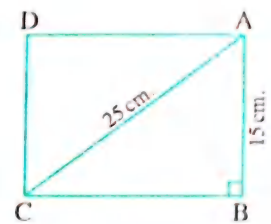
Find : $m(\angle ACB)$ in degree measure

, then find the area of the rectangle ABCD

- [b]** The opposite table shows a linear relation.

Find : **1** The equation of the straight line.

2 The length of the intercepted part from y-axis.



x	1	2	3
y	1	3	5

4 [a] prove that the quadrilateral ABCD whose vertices are

$A(-1, 3)$, $B(5, 1)$, $C(7, 4)$ and $D(1, 6)$ is a parallelogram.

- [b]** Find the slope of the straight line which intersects from the positive parts of two coordinates X-axis and y-axis two parts of lengths 3 units , 4 units respectively , then find the equation of this straight line.

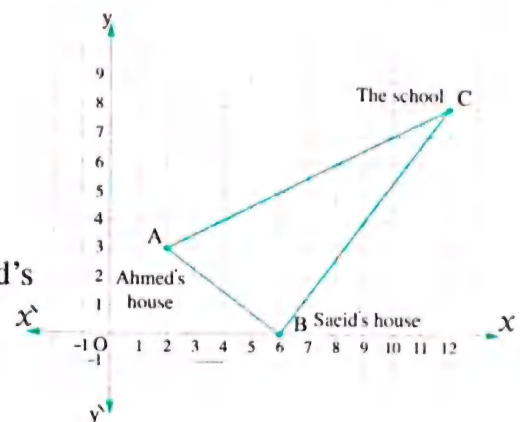
5 [a] Without using calculator , find the value of : $\sin 45^\circ \cos 45^\circ + \sin 30^\circ \cos 60^\circ - \cos^2 30^\circ$

[b] In the opposite figure :

A represents the location of Ahmed's house
 , B represents the location of Saeid's house
 , C represents the location of the School.

- 1** Which is nearer (closer) to the school : Ahmed's house or Saeid's house ? Why ?
 Without measuring.

- 2** Are the two roads \overline{AB} and \overline{BC} perpendicular ?
 giving reason , without measuring.



10

Suez Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

- 1 If $\sin 30^\circ = \cos \theta$ where θ is an acute angle , then $\theta = \dots\dots\dots^\circ$
 (a) 15 (b) 30 (c) 60 (d) 90
- 2 ABC is a triangle in which : $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is
 (a) acute. (b) obtuse. (c) right. (d) reflex.
- 3 If A (- 2 , 5) , B (2 , - 5) , then the midpoint of \overline{AB} is
 (a) (0 , 0) (b) (2 , 5) (c) (5 , 2) (d) (- 5 , - 2)
- 4 If \overline{XY} is the axis of symmetry of \overline{AB} , then $XA \dots\dots\dots XB$
 (a) > (b) < (c) = (d) \leq
- 5 If m_1 , m_2 are the slopes of two perpendicular straight lines , then $m_1 \times m_2 = \dots\dots\dots$
 (a) - 1 (b) zero (c) 1 (d) 2
- 6 The surface area of the rhombus ABCD =
 (a) $\frac{1}{2} AB \times DC$ (b) $\frac{1}{2} AC \times BD$ (c) $\frac{1}{2} AB \times AD$ (d) $\frac{1}{2} AD \times BC$

2 [a] Find the equation of the straight line whose slope is 2 and intersects from the positive part of the y-axis a part equals 7 units.

[b] Find the value of X if : $4X = \cos^2 30^\circ \tan^2 30^\circ \tan^2 45^\circ$

3 [a] ABCD is a parallelogram whose diagonals intersect at E
 if A (4 , 3) , B (0 , 2) , C (- 2 , - 3) , then find the coordinates of E , D

[b] Without using calculator , prove that :

$$\tan^2 60^\circ - \tan^2 45^\circ = \sin^2 60^\circ + \cos^2 60^\circ + 2 \sin 30^\circ$$

4 [a] Prove that the straight line passing through the two points (2 , - 1) , (6 , 3) is parallel to the straight line that makes with the positive direction of the X-axis an angle of measure 45°

[b] ABC is a right-angled triangle at B , if $2AB = \sqrt{3}AC$
 , find : $\sin C$, $\tan A$

5 [a] Prove that the points A (- 3 , 0) , B (3 , 4) , C (1 , - 6) are the vertices of an isosceles triangle of vertex A

[b] Find the equation of the straight line which passes through the point (3 , 5) and is perpendicular to the straight line whose slope equals $-\frac{1}{2}$

11

Port Said Governorate



Answer the following questions :

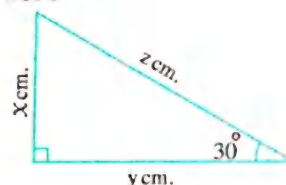
1 Choose the correct answer from those given :

1 The product of multiplying the slopes of two perpendicular straight lines equals

- (a) 1 (b) -1 (c) ± 1 (d) zero

2 In the opposite figure :

- (a) $x + y = \frac{1}{2} z$ (b) $z = x^2 + y^2$
 (c) $x = \frac{1}{2} z$ (d) $2y = z$



3 $\sin 30^\circ = \cos \dots$

- (a) 10° (b) 45° (c) 30° (d) 60°

4 $\tan 45^\circ = \dots$

- (a) 1 (b) $2\sqrt{2}$ (c) $\frac{1}{2}$ (d) $\sqrt{2}$

5 If A (5 , 7) , B (1 , -1) , then the midpoint of \overline{AB} is

- (a) (2 , 3) (b) (3 , 3) (c) (3 , 2) (d) (3 , 4)

6 If $\overline{AB} \parallel \overline{CD}$ and the slope of $\overline{AB} = \frac{2}{3}$, then the slope of $\overline{CD} = \dots$

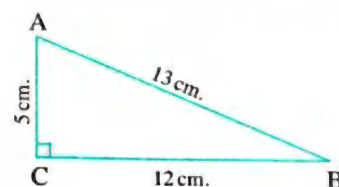
- (a) $\frac{3}{2}$ (b) $-\frac{3}{2}$ (c) $-\frac{2}{3}$ (d) $\frac{2}{3}$

2 [a] In the opposite figure :

ABC is a right-angled triangle at C
 , AB = 13 cm. , BC = 12 cm. , AC = 5 cm.

1 Prove that : $\sin A \cos B + \cos A \sin B = 1$

2 Find : $1 + \tan^2 A$



[b] Find the value of the following : $\sin 45^\circ \cos 45^\circ + \sin 30^\circ \cos 60^\circ - \cos^2 30^\circ$

3 [a] Find $m(\angle E)$, where $\angle E$ is an acute angle : $\sin E = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$

[b] Prove that the straight line passing through the two points (-3 , -2) , (4 , 5) is parallel to the straight line that makes with the positive direction of the X-axis an angle of measure 45° .

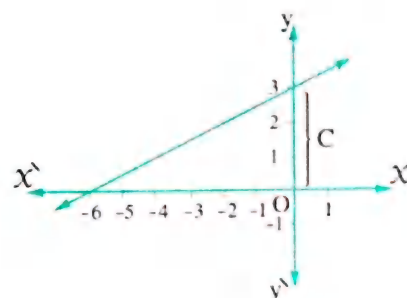
4 [a] Find the equation of the straight line passing through the point (1 , 2) and perpendicular to the straight line passing through the two points A (2 , -3) , B (5 , -4)

[b] Prove that the points A (3 , -1) , B (-4 , 6) and C (2 , -2) are located on the circle whose centre is the point M (-1 , 2)

- 5 [a] ABCD is a parallelogram where A (3, 2), B (4, -5), C (0, -3), find the coordinates of the point at which the two diagonals intersect, then find the coordinates of the point D

[b] Using the opposite figure, find the following :

- 1 The length of the y-intercept (c)
- 2 The length of the x-intercept.
- 3 The slope of the straight line (m)



12

Damietta Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from the given answers :

- 1 If the lengths of two sides of an isosceles triangle are 2 cm. and 5 cm. , then the length of the third side is cm.

(a) 2 (b) 3 (c) 5 (d) 7

- 2 If $\sin X = \frac{1}{2}$, X is the measure of an acute angle, then $\sin 2X = \dots\dots\dots$

(a) $\frac{\sqrt{3}}{3}$ (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{\sqrt{2}}{2}$ (d) 1

- 3 The surface area of the square is equal to the square of the length of the diagonal divided by

(a) 1 (b) 2 (c) 3 (d) 4

- 4 The equation of the straight line which passes through the point (-2, 5) and is parallel to X-axis is

(a) $X = -2$ (b) $X = 5$ (c) $y = -2$ (d) $y = 5$

5 In the opposite figure :

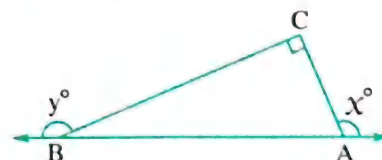
$A \in \overleftrightarrow{AB}$, $B \in \overleftrightarrow{AB}$, $m(\angle C) = 90^\circ$

, then $X + y = \dots\dots\dots$

(a) 90° (b) 180° (c) 270° (d) 360°

- 6 If \overleftrightarrow{AB} , \overleftrightarrow{DC} are parallel, their slopes are m_1 , m_2 , then

(a) $m_1 = -m_2$ (b) $m_1 - m_2 = 0$ (c) $m_1 m_2 = -1$ (d) $m_1 m_2 = 1$



- 2 [a] ABC is a right-angled triangle at C, AC = 6 cm. , BC = 8 cm.

Find : $\cos A \cos B - \sin A \sin B$

[b] Find the equation of the straight line which intercepts from the positive parts of the two parts of lengths 3 units and 2 units for x and y axes respectively and find its slope.

3 [a] If the distance of the point $(x, 5)$ from the point $(6, 1)$ equals $2\sqrt{5}$ length units, then find the value of x

[b] Find the equation of the straight line which passes through the points $(2, -1)$, $(1, 1)$ and if the point $(0, k) \in$ the straight line, find the value of k

4 [a] Find the value of x if : $4x = \cos^2 30^\circ \tan^2 30^\circ \tan^2 45^\circ$ (Indicating the steps of the solution)

[b] If the straight line passing through the two points $(a, 0)$, $(0, 3)$ is perpendicular to the straight line that makes an angle of measure 30° with the positive direction of the x -axis find a .

5 [a] Prove that : $\sin 45^\circ \cos 45^\circ + \sin 30^\circ \cos 60^\circ - \cos^2 30^\circ = 0$ (Indicating the steps of the solution)

[b] Find the equation of the straight line perpendicular to \overline{AB} from its midpoint C where $A(1, 3)$ and $B(3, 5)$

13

Kafr El-Sheikh Governorate



Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from those given :

1 In ΔABC , if $m(\angle A) = 60^\circ$, $\sin B = \cos B$, then $m(\angle C) = \dots\dots\dots$

(a) 30° (b) 75° (c) 90° (d) 105°

2 The area of the triangle bounded by the straight lines : $x = 0$, $y = 0$, $5x + 2y = 10$ is $\dots\dots\dots$ square units.

(a) 10 (b) 8 (c) 7 (d) 5

3 If the straight line passing through the two points $(\sqrt{3}, 1)$, $(2\sqrt{3}, y)$ its slope equals $\tan 60^\circ$, then $y = \dots\dots\dots$

(a) 2 (b) 3 (c) 4 (d) 5

4 If the straight line $ax + (2 - a)y = 5$ is parallel to the straight line passing through the two points $(1, 4)$, $(3, 5)$, then $a = \dots\dots\dots$

(a) 3 (b) -2 (c) 1 (d) zero

5 If the point $(l - 3, 2)$ is in the first quadrant, then l can be equal to $\dots\dots\dots$

(a) -3 (b) 2 (c) 7 (d) zero

6 The complement of the angle whose measure is 65° is of measure $\dots\dots\dots$

(a) 35° (b) 25° (c) 115° (d) 45°

- 2 [a] ABC is a right-angled triangle at B , AC = 13 cm. , BC = 12 cm.

Prove that : $\sin^2 C + \sin^2 A = 1$

- [b] If the point A (5 , 2) lies on the circle of centre M (1 , -1) , then find :

- 1 The surface area of the circle in terms of π
- 2 The equation of the straight line which passes through A and M

- 3 [a] If A (-3 , 5) , B (-1 , 7) , find the equation of the axis of symmetry of \overline{AB}

- [b] Without using the calculator , prove that :

$$\tan^2 60^\circ - \tan^2 45^\circ = \sin^2 60^\circ + \cos^2 60^\circ + 2 \sin 30^\circ$$

- 4 [a] Prove that the points A (-1 , 3) , B (5 , 1) , C (7 , 4) , D (1 , 6) are the vertices of the parallelogram ABCD

- [b] ABCD is an isosceles trapezoid in which $\overline{AD} \parallel \overline{BC}$, AD = 4 cm. , AB = 5 cm.

, BC = 12 cm. , then calculate : $\frac{\tan B \cos C}{\cos^2 C + \sin^2 C}$

- 5 [a] If the straight line L_1 passes through the two points (3 , 1) , (2 , k) and the straight line L_2 makes with the positive direction of X-axis an angle of measure 45°

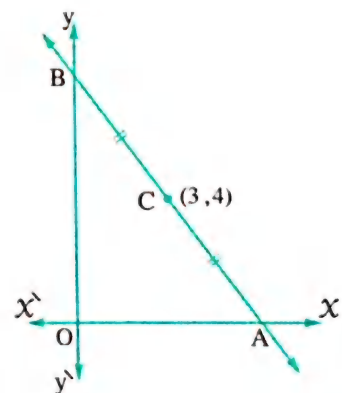
, find the value of k if : 1 $L_1 \parallel L_2$ 2 $L_1 \perp L_2$

- [b] In the opposite figure :

The point C is the midpoint of \overline{AB}
where C (3 , 4) , O is the origin point of the perpendicular coordinates system.

Find : 1 The coordinates of the two points A and B

2 The equation of \overline{AB}



14

El-Beheira Governorate

Answer the following questions : (Calculator is permitted)

- 1 Choose the correct answer from the given ones :

- 1 If A (5 , 7) , B (1 , -1) , then the midpoint of \overline{AB} is

(a) (2 , 3) (b) (3 , 3) (c) (3 , 2) (d) (3 , 4)

- 2 If $m(\angle B) = 80^\circ$, then $m(\text{reflex } \angle B) = \dots\dots\dots$

(a) 10° (b) 100° (c) 80° (d) 280°

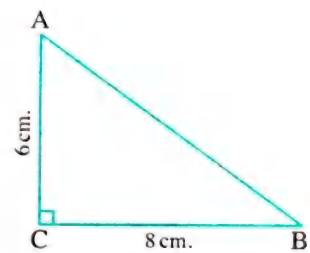
- 3 The slope of the straight line which is parallel to the straight line passing through the two points $(2, 3)$, $(-2, 4)$ equals
- (a) -1 (b) $-\frac{1}{4}$ (c) $\frac{1}{4}$ (d) 1
- 4 If $\tan(X + 10^\circ) = \sqrt{3}$ where X is the measure of an acute angle, then $X = \dots\dots\dots$
- (a) 30° (b) 45° (c) 50° (d) 60°
- 5 In a parallelogram, the two diagonals are
- (a) perpendicular. (b) equal in length.
(c) equal in length and perpendicular. (d) bisecting each other.
- 6 The triangle whose sides lengths are 2 cm., $(X + 2)$ cm. and 5 cm. becomes an isosceles triangle when $X = \dots\dots\dots$
- (a) zero (b) 2 (c) 3 (d) 5

2 [a] In the opposite figure :

ABC is a right-angled triangle
at C, $AC = 6$ cm., $BC = 8$ cm.

Find : 1 $\cos A \cos B - \sin A \sin B$

2 $m(\angle B)$



- [b] State the kind of the triangle whose vertices are the points $A(-2, 4)$, $B(3, -1)$, $C(4, 5)$ with respect to its sides.

3 [a] Without using the calculator, prove that :

$$\tan^2 60^\circ - \tan^2 45^\circ = \cos^2 30^\circ + \cos^2 60^\circ + 2 \sin 30^\circ$$

- [b] Find the equation of the straight line whose slope equals 2 and intersects from the negative part of the y -axis a part equals 3 units and draw it.

4 [a] Find the value of X which satisfies : $X \sin 30^\circ \cos^2 45^\circ = \sin^2 60^\circ$

- [b] If the straight line L_1 passes through the two points $(3, 1)$, $(2, k)$ and the straight line L_2 makes with the positive direction of the X -axis an angle of measure 45° , find the value of k , if $L_1 \parallel L_2$

5 [a] If the point $(3, 1)$ is the midpoint of \overline{AB} where $A(1, y)$ and $B(X, 3)$, find the point (X, y)

- [b] Find the equation of the straight line passing through the point $(3, -5)$ and perpendicular to the straight line : $X + 2y - 7 = 0$



Answer the following questions : (Using calculators is allowed)

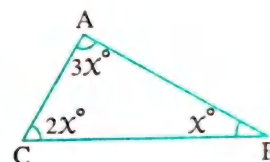
1 Choose the correct answer :

- 1 If $\tan 3X = \sqrt{3}$ where X is the measure of an acute angle , then $X = \dots\dots\dots^\circ$
 (a) 10 (b) 15 (c) 20 (d) 30
- 2 If the perimeter of a square is 16 cm. , then its area is $\dots\dots\dots \text{cm}^2$
 (a) 4 (b) 16 (c) 60 (d) 90
- 3 The perpendicular distance between the two straight lines : $X - 2 = 0$, $X + 3 = 0$ equals $\dots\dots\dots$ length units.
 (a) 1 (b) 5 (c) 2 (d) 3

4 In the opposite figure :

ΔABC is $\dots\dots\dots$ triangle.

- (a) an isosceles. (b) an equilateral.
 (c) an obtuse-angled. (d) a right-angled.



5 The area of the triangle identified by the straight lines :

$3X - 4y = 12$, $X = 0$, $y = 0$ equals $\dots\dots\dots$ square units.

- (a) 6 (b) 7 (c) 12 (d) 5

6 The measure of the angle of the regular hexagon is $\dots\dots\dots$

- (a) 108° (b) 90° (c) 120° (d) 60°

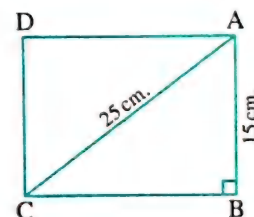
2 [a] In the opposite figure :

ABCD is a rectangle in which $AB = 15 \text{ cm}$.

, $AC = 25 \text{ cm}$.

Find : 1 $m(\angle ACB)$

2 The surface area of the rectangle ABCD



- [b] If the distance between the two points $(a, 7)$, $(-2, 3)$ equals 5 length units , find the values of a

3 [a] Without using the calculator , find the value of X (where X is the measure of an acute angle) which satisfies :

$$2 \sin X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$$

- [b] Prove that the straight line passing through the two points $(-1, 3)$, $(2, 4)$ is parallel to the straight line $3y - X - 1 = 0$

- 4** [a] ABCD is a quadrilateral, where A (5, 3), B (6, -2), C (1, -1), D (0, 4).
Prove that : ABCD is a rhombus.

- [b] If A (5, -6), B (3, 7) and C (1, -3), find the equation of the straight line passing through the point A and the midpoint of \overline{BC}

- 5** [a] Without using the calculator, prove that :

$$\frac{\cos^2 60^\circ + \cos^2 30^\circ + \tan^2 45^\circ}{\sin 60^\circ \tan 60^\circ - \sin 30^\circ} = 2$$

- [b] If the straight line L_1 passes through the two points A (3, 1), B (2, y) and the straight line L_2 makes an angle whose measure is 45° with the positive direction of X-axis, then find the value of y if $L_1 \perp L_2$



Answer the following questions : (Calculator is allowed)

- 1** Choose the correct answer from those given :

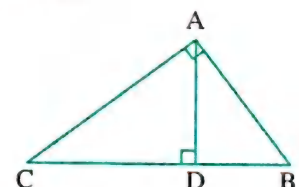
- 1** The product of multiplying the slopes of two perpendicular straight lines equals
 (a) zero (b) 1 (c) -1 (d) $\frac{1}{2}$
- 2** If \overline{AB} is a diameter in a circle of centre M, where A (2, 4) and B (-2, 0), then M =
 (a) (0, 2) (b) (2, 0) (c) (0, 0) (d) (2, 2)
- 3** The quadrilateral whose diagonals are equal in length and perpendicular is the
 (a) parallelogram. (b) rhombus. (c) rectangle. (d) square.
- 4** If the lengths of two sides of a triangle are 2 cm. and 5 cm., then the length of the third side \in
 (a) $]2, 5[$ (b) $]3, 7[$ (c) $]2, 7[$ (d) $]3, 5[$

- 5** In the opposite figure :

If $m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$, then $(AD)^2 =$

- (a) $AB \times AC$ (b) $DB \times DC$ (c) $BD \times BC$ (d) $(AB)^2 + (BD)^2$

- 6** If $\tan(X + 15^\circ) = 1$, where X is the measure of an acute angle, then X =
 (a) 60° (b) 45° (c) 30° (d) 15°



- 2 [a] Find the area of the rectangle ABCD where A (−1, 3), B (5, 1), C (6, 4) and D (0, 6)

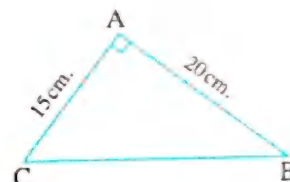
[b] Find the value of X if : $X \cos 60^\circ = \sin 30^\circ + \tan 45^\circ$

- 3 [a] Prove that the straight line passing through the two points (−1, 0) and (3, 4) is parallel to the straight line that makes a positive angle of measure 45° with the positive direction of the X -axis.

[b] In the opposite figure :

ABC is a right-angled triangle at A
 , AB = 20 cm. and AC = 15 cm.

Prove that : $\cos C \cos B - \sin C \sin B = \text{zero}$



- 4 [a] If C ($X, -3$) is the midpoint of \overline{AB} where A (−3, y), B (9, 11), find the value of : $X + y$

[b] Without using the calculator, find the value of the expression :
 $\sin 45^\circ \cos 45^\circ + 3 \sin 30^\circ \cos 60^\circ - \cos^2 30^\circ$

- 5 [a] Find the equation of the straight line passing through the point (2, −5) and perpendicular to the straight line whose equation is $y - 2x + 7 = 0$
- [b] Prove that the points A (2, 3), B (6, 2), C (0, −1) and D (−2, 1) are the vertices of a trapezoid.

17

El-Menia Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer :

- 1 The measure of the exterior angle of the equilateral triangle equals
 (a) 60° (b) 90° (c) 120° (d) 180°
- 2 If L_1, L_2 are two lines parallel and their slopes are $-\frac{2}{3}, \frac{k}{6}$, then $k =$
 (a) −12 (b) −9 (c) 4 (d) −4
- 3 The lengths of two sides of an isosceles triangle equal 2 cm, 5 cm, then the length of the third side equals cm.
 (a) 5 (b) 2 (c) 3 (d) 7
- 4 The distance between the point (5, 12) and the point of origin equals units.
 (a) 5 (b) 13 (c) 12 (d) $\sqrt{17}$

5 The area of the square whose perimeter is 16 cm. equals cm²

- (a) 4 (b) 8 (c) 16 (d) 256

6 XYZ is an isosceles triangle right-angled at Z , then $\tan X = \dots\dots\dots$

- (a) $\frac{1}{\sqrt{3}}$ (b) $\sqrt{3}$ (c) 1 (d) $\frac{1}{3}$

2 [a] Prove that the triangle whose vertices are A (6 , 0) , B (2 , - 4) , C (- 4 , 2) is right-angled at B

[b] XYZ is a right-angled triangle at Z where $XZ = 7$ cm. Find the value of : $\tan X \times \tan Y$

3 [a] Find X where : $4X = \cos^2 30^\circ \tan^2 30^\circ \tan^2 45^\circ$

[b] Find the equation of the straight line passing through the point (3 , - 5) and parallel to the straight line $X + 2y - 7 = 0$

4 [a] ABCD is a parallelogram , A (- 2 , 5) , B (3 , 3) , C (- 4 , 2) Find the two coordinates of the point at which the two diagonals intersect , then find the coordinates of the point D

[b] Without using the calculator , prove that : $\sin^2 30^\circ = 5 \cos^2 60^\circ - \tan^2 45^\circ$

5 [a] If the straight line L_1 passes through the two points (3 , 1) , (2 , k) and the straight line L_2 makes with the positive direction of the X-axis an angle whose measure is 45° , then find k , if the two straight lines L_1 , L_2 are perpendicular.

[b] Find the equation of the straight line which intersects from the positive parts of X and y axes two parts of lengths 2 units , 3 units respectively.

18

Assiut Governorate



Answer the following questions : (Calculator is permitted)

1 Choose the correct answer :

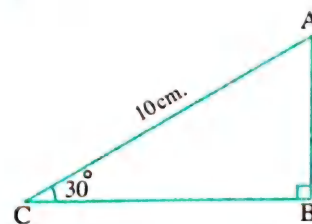
1 The sum of the measures of the interior angles of a triangle equals

- (a) 90° (b) 180° (c) 360° (d) 540°

2 In the opposite figure :

AB = cm.

- (a) 5 (b) 15
(c) 20 (d) 40



- 3 The measure of the interior angle of a regular hexagon equals
- (a) 108° (b) 120° (c) 90° (d) 180°
- 4 If $2 \sin X = 1$ (where X is the measure of an acute angle), then $X = \dots\dots\dots$
- (a) 45° (b) 90° (c) 30° (d) 60°
- 5 The equation of the straight line which passes through the point $(2, -3)$ and is parallel to X -axis is
- (a) $X = 2$ (b) $y = -3$ (c) $X = -2$ (d) $y = 3$
- 6 If the origin point is the midpoint of \overline{AB} , $A(5, -2)$, then $B = \dots\dots\dots$
- (a) $(5, 2)$ (b) $(-5, -2)$ (c) $(-5, 2)$ (d) $(0, 0)$

2 [a] Prove that the points $A(-3, -1)$, $B(6, 5)$ and $C(3, 3)$ are collinear.

[b] Find the value of X that satisfies : $X \sin 30^\circ \cos^2 45^\circ = \sin^2 60^\circ$

3 [a] If the triangle whose vertices are $Y(4, 2)$, $X(3, 5)$ and $Z(-5, a)$ is right-angled at Y , then find the value of a

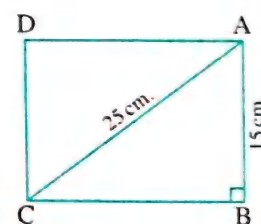
[b] Find the equation of the straight line whose slope is 2 and intersects from the positive part of the y -axis a part that equals 7 units.

4 [a] In the opposite figure :

$ABCD$ is a rectangle in which $AB = 15$ cm.
and $AC = 25$ cm.

Find : 1 $m(\angle ACB)$

2 The surface area of the rectangle $ABCD$



[b] Prove that the straight line which passes through the points $(2, 3)$, $(0, 0)$ is parallel to the straight line which passes through $(-1, 4)$, $(1, 7)$

5 [a] $ABCD$ is a quadrilateral, where $A(5, 3)$, $B(6, -2)$, $C(1, -1)$, and $D(0, 4)$
Prove that : $ABCD$ is a rhombus.

[b] Find the slope and the intercepted part of y -axis by the straight line :
 $2X - 3Y - 6 = 0$

19

Souhag Governorate



Answer the following questions : (Calculator is permitted)

1 Choose the correct answer :

1 If $\sin \frac{X}{2} = \frac{1}{2}$, X is the measure of an acute angle, then $X = \dots\dots\dots^\circ$

- (a) 30 (b) 60 (c) 10 (d) 90

2 The perimeter of the square whose surface area is 100 cm^2 equals $\dots\dots\dots \text{ cm}$.

- (a) 10 (b) 20 (c) 40 (d) 50

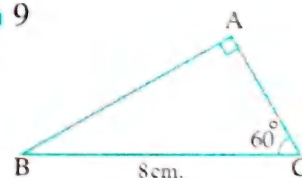
3 If $\frac{-2}{3}$, $\frac{6}{k}$ are the slopes of two perpendicular straight lines, then $k = \dots\dots\dots$

- (a) 4 (b) -9 (c) -4 (d) 9

4 In the opposite figure :

The length of $\overline{AC} = \dots\dots\dots \text{ cm}$.

- (a) 2 (b) 6
(c) 4 (d) 8



5 The equation of the straight line passing through the origin point and its slope = 1 is $\dots\dots\dots$

- (a) $y = X$ (b) $y = -X$ (c) $y = 2X$ (d) $y = 0$

6 If the numbers 3, 7, l are lengths of sides of a triangle, then l can be equal to $\dots\dots\dots$

- (a) 3 (b) 7 (c) 4 (d) 10

2 [a] If the midpoint of \overline{BC} is A (2, 3) and C (-1, 3), find the point B

[b] If $\cos X = \sin 30^\circ \cos 60^\circ$, find :

1 The measure of $\angle X$ (where X is an acute angle)

2 $\tan X$

3 [a] If the straight line whose equation is : $aX + 2y - 7 = 0$ is parallel to the straight line which makes an angle of measure 45° with the positive direction of X -axis, find the value of a

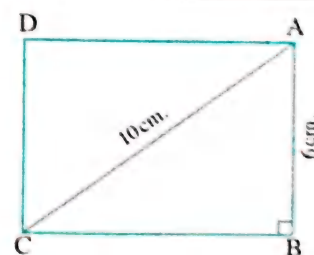
[b] Without using calculator, prove that : $\tan^2 60^\circ - \tan^2 45^\circ = 4 \sin 30^\circ$

4 [a] In the opposite figure :

ABCD is a rectangle where $AB = 6 \text{ cm}$, $AC = 10 \text{ cm}$.

Find : 1 $m(\angle ACB)$

2 The surface area of the rectangle ABCD



[b] Find the equation of the straight line passing through the point (1, 2) and perpendicular to the straight line $x + 3y + 7 = 0$

5 [a] Prove that the points A (3, -1), B (-4, 6), C (2, -2) which belong to a perpendicular coordinates plane lie on the circle whose centre is the point M (-1, 2), then find the area of the circle.

[b] Find the slope and the intercepted part of y-axis by the straight line where its equation is $4x + 5y - 10 = 0$

20

Qena Governorate



Answer the following questions :

1 Choose the correct answer from those given :

1 $\sin 30^\circ = \dots\dots\dots$

(a) 1

(b) $\frac{\sqrt{3}}{2}$

(c) $\cos 60^\circ$

(d) $\frac{1}{\sqrt{2}}$

2 The number of diagonals of the hexagon equals

(a) 5

(b) 6

(c) 2

(d) 9

3 If O the origin point is the midpoint of \overline{AB} as A = (-2, 5), then B =

(a) (2, 5)

(b) (2, -5)

(c) (-2, 5)

(d) (-2, -5)

4 If the measure of two angles of a triangle are 70° , 40° , then the number of its axes equal

(a) 1

(b) 2

(c) 3

(d) zero

5 If L_1 , L_2 are two parallel straight lines of slopes m_1 , m_2 respectively, then

(a) $m_1 - m_2 = \text{zero}$

(b) $m_1 = -m_2$

(c) $m_1 \times m_2 = 1$

(d) $m_1 \times m_2 = -1$

6 If the lengths of two sides of a triangle are 2 cm., 5 cm., then the length of the third side can be

(a) 2 cm.

(b) 3 cm.

(c) 4 cm.

(d) 1 cm.

2 [a] Without using calculator, find the value of : $\cos 60^\circ \sin 30^\circ - \sin 60^\circ \cos 30^\circ$

[b] Find the equation of the straight line which makes with the positive direction of X-axis a positive angle of measure 135° and intercepts from the positive part of y-axis a part of length 5 length units.

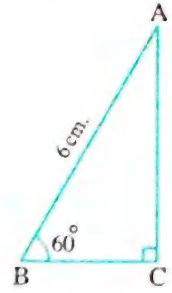
3 [a] Prove that the points A (1, 4), B (-1, -2), C (2, -3) are the vertices of a right-angled triangle, find its area.

[b] In the opposite figure :

ΔABC is a right-angled triangle at C

, $AB = 6 \text{ cm.}$, $m(\angle B) = 60^\circ$

Find : The length of \overline{AC}



4 [a] Find the slope of the straight line whose equation is :

$2x - 6y = 12$, then find the points of intersection with the coordinates axes.

[b] Without using calculator , find the value of x (where x is the measure of an acute angle) that satisfies :

$$\tan x = 4 \cos 60^\circ \sin 30^\circ$$

5 [a] Prove that the straight line which passes through the two points $(1, 3)$, $(2, 4)$ is parallel to the straight line whose equation is : $y - x = 5$

[b] Prove that the figure ABCD is a rectangle where $A(1, 0)$, $B(-1, 4)$, $C(7, 8)$, $D(9, 4)$

21

Luxor Governorate



Answer the following questions :

1 Choose the correct answer :

1 The length of the side opposite to the angle of measure 30° in the right-angled triangle equals the length of the hypotenuse.

- (a) quarter. (b) twice. (c) half. (d) third.

2 If $\tan(2x - 5) = 1$ where x is the measure of an acute angle , then $x =$

- (a) 15° (b) 75° (c) 50° (d) 25°

3 If the diagonal length of a square is 10 cm. , then its area = cm^2

- (a) 100 (b) 75 (c) 50 (d) 25

4 The straight line passing by the two points $(0, 0)$, $(2, 3)$ is parallel to the straight line whose slope is

- (a) $\frac{3}{2}$ (b) $\frac{2}{3}$ (c) $-\frac{3}{2}$ (d) $-\frac{2}{3}$

5 The image of the point $(3, -2)$ by reflection in the x -axis is

- (a) $(-2, 3)$ (b) $(3, 2)$ (c) $(2, -3)$ (d) $(-3, -2)$

6 The slope of the straight line $x - 5 = 0$ is

- (a) 5 (b) $\frac{1}{5}$ (c) zero (d) undefined.

2 [a] Find in degrees the value of X if : $\tan 2X = 4 \sin 30^\circ \cos 30^\circ$ where $0^\circ < X < 90^\circ$

[b] Find the equation of the straight line passing by the point $(3, 5)$ and is parallel to the straight line $2X - 3y + 6 = 0$

3 [a] Prove that the straight line passing by the two points $(7, -3)$, $(5, -1)$ is perpendicular to the straight line which makes an angle of measure 45° with the positive direction of X -axis.

[b] Without using the calculator , prove that : $2 \sin 30^\circ + 4 \cos 60^\circ = \tan^2 60^\circ$

4 [a] If the distance between the points $(a, 0)$, $(0, 1)$ equals $\sqrt{2}$ length unit find a

[b] If \overline{AB} is a diameter in the circle M where $A(4, -1)$, $B(-2, 7)$, find the coordinates of the point M and the radius length of the circle.

5 [a] Prove that the points $A(-1, -4)$, $B(1, 0)$, $C(2, 2)$ are collinear.

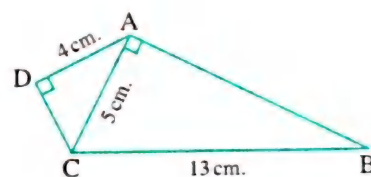
[b] In the opposite figure :

$$m(\angle ADC) = m(\angle BAC) = 90^\circ$$

$$, AD = 4 \text{ cm.}, AC = 5 \text{ cm.}, BC = 13 \text{ cm.}$$

Find the value of :

$$\tan(\angle DAC) \sin(\angle ACB) - \sin(\angle B) \cos(\angle CAD)$$



22

Aswan Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 The measure of the exterior angle of the equilateral triangle is°

(a) 60

(b) 90

(c) 120

(d) 180

2 $4 \sin 30^\circ \cos 60^\circ = \dots\dots\dots$

(a) 1

(b) 2

(c) 3

(d) 4

3 The length of the opposite side of the angle with measure 30° in the right-angled triangle equals the length of the hypotenuse.

(a) $\frac{1}{4}$

(b) $\frac{1}{3}$

(c) $\frac{1}{2}$

(d) $\frac{3}{4}$

- 4 The equation of the straight line passing through the point $(-2, -3)$ and parallel to X -axis is
- (a) $y = -2$ (b) $y = -3$ (c) $x = -2$ (d) $x = -3$
- 5 ΔABC is an isosceles triangle in which $AB = 3$ cm. , $BC = 7$ cm. , then $AC =$ cm.
- (a) 3 (b) 4 (c) 7 (d) 10
- 6 The distance between the two straight lines $x - 2 = 0$, $x + 3 = 0$ equals length units
- (a) 1 (b) 2 (c) 3 (d) 5

- 2 [a] Find the equation of the straight line which passes through the two points $(1, 3)$, $(-1, -3)$
- [b] Prove that the points $A(3, -1)$, $B(-4, 6)$, $C(2, -2)$ lie on the circle whose centre is $M(-1, 2)$, then find the circumference of the circle.

- 3 [a] **Without using calculator , find the measure of $\angle E$ (Such that E is an acute angle)**
If : $2 \sin E = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$
- [b] If C is the midpoint of \overline{AB} , then find x, y where $A(x, 3)$, $B(6, y)$, $C(4, 6)$

- 4 [a] ΔABC is right-angled at C in which $AC = 6$ cm. , $BC = 8$ cm.
Find : 1 $\cos A \cos B - \sin A \sin B$ 2 $m(\angle B)$
- [b] If the straight line L_1 passes through the two points $(3, 1)$, $(2, k)$ and the straight line L_2 makes with the positive direction of the x -axis an angle of measure 45° , **find the value of k if the two straight lines are : 1 Parallel. 2 Perpendicular.**

- 5 [a] Find the equation of the straight line which passes through the point $(3, -5)$ and is parallel to the straight line $x + 2y - 7 = 0$
- [b] **Find the value of x if : $x \sin 30^\circ \cos^2 45^\circ = \sin^2 60^\circ$**



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :
- 1 The area of the square whose perimeter is 16 cm. equals cm^2
- (a) 4 (b) 8 (c) 16 (d) 256
- 2 If the lengths of two sides of an isosceles triangle are 3 cm. , 7 cm. , then the length of the third side is cm.
- (a) 4 (b) 7 (c) 10 (d) 3

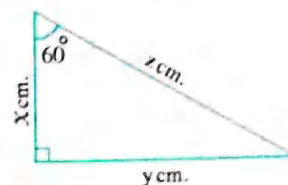
3 In the opposite figure :

(a) $x + y = z$

(b) $z = x^2 + y^2$

(c) $2x = z$

(d) $y = \frac{1}{2} z$



4 $2 \sin 30^\circ \tan 60^\circ = \dots\dots\dots$

(a) $\sqrt{3}$

(b) 3

(c) $\frac{3}{2}$

(d) $\frac{1}{2}$

5 If $x + y = 5$, k $x + 2y = 0$ are perpendicular , then k =

(a) 1

(b) -1

(c) 2

(d) -2

6 If A (5 , 7) , B (1 , -1) , then the midpoint of \overline{AB} is

(a) (2 , 3)

(b) (3 , 3)

(c) (3 , 2)

(d) (3 , 4)

2 [a] ABC is a triangle , $m(\angle B) = 90^\circ$, AB = 15 cm. , BC = 20 cm.

Prove that : $\cos A \cos C - \sin A \sin C = 0$

[b] If the point C (3 , 1) is the midpoint of \overline{AB} where A (1 , y) , B (x , 3) , find the point : (x , y)

3 [a] If the points (0 , 1) , (a , 3) , (2 , 5) are located on one straight line , then find the value of a

[b] Prove that the points A (3 , -1) , B (-4 , 6) , C (2 , -2) which belong to an orthogonal Cartesian coordinates plane lie on the circle whose centre is M (-1 , 2) , then find the circumference of the circle in terms of π

4 [a] Find the equation of the straight line passing through the point (3 , 5) and parallel to the straight line $x + 3y = 7$

[b] Find the value of x (where x is the measure of an acute angle) :

$$2 \sin x = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$$

5 [a] Find the equation of the straight line whose slope is 2 and intersects from the negative part of y-axis a part of length 3 units.

[b] Without using the calculator , prove that : $\sin 60^\circ = 2 \sin 30^\circ \cos 30^\circ$

24

South Sinai Governorate



Answer the following questions :

1 Choose the correct answer from those given :

1 The distance between the two points (4 , 0) and (0 , -3) equals length units.

(a) 5

(b) 4

(c) 3

(d) 12

- 2 If $\cos (X + 30^\circ) = \frac{1}{2}$ where X is the measure of an acute angle , then $X = \dots\dots\dots^\circ$
 (a) 60 (b) 30 (c) 45 (d) 20
- 3 ABC is a triangle in which $AB = AC$ and $m (\angle B) = 30^\circ$, then $m (\angle A) = \dots\dots\dots^\circ$
 (a) 60 (b) 30 (c) 120 (d) 40
- 4 If $A = (5 , 7)$ and $B = (- 1 , - 3)$, then the midpoint of \overline{AB} is
 (a) $(2 , - 2)$ (b) $(- 2 , 2)$ (c) $(- 2 , - 2)$ (d) $(2 , 2)$
- 5 The number of symmetry axes of an isosceles triangle equals
 (a) 1 (b) zero (c) 2 (d) 3
- 6 ABC is a right-angled triangle at B , D is the midpoint of \overline{AC} and $BD = 5$ cm. , then $AC = \dots\dots\dots$ cm.
 (a) 5 (b) 10 (c) 15 (d) 20

2 [a] ABC is a right-angled triangle at B , $AC = 13$ cm. , $BC = 12$ cm.
Prove that : $\sin^2 C + \cos^2 C = 1$

[b] Find the equation of the straight line passing through the point $(2 , - 3)$ and parallel to the straight line $y = x + 4$

3 [a] **Without using calculator , prove that :** $\cos 60^\circ = 2 \cos^2 30^\circ - 1$

[b] Find the equation of the straight line which passes through the point $(3 , - 4)$ and makes with the positive direction of the X -axis an angle of measure 45°

4 [a] If the distance between the two points $(a , 7)$ and $(- 2 , 3)$ equals 5 length units , find the values of a

[b] **Find the value of X where X is the measure of an acute angle satisfying the equation :**
 $\sin X = 2 \sin 30^\circ \cos 30^\circ$

5 [a] Find the equation of the straight line passing through the point $(3 , 4)$ and perpendicular to the straight line whose slope $= \frac{-1}{2}$

[b] **Prove that the triangle of the vertices $A = (0 , 0)$, $B = (4 , 0)$ and $C = (0 , 3)$ is right-angled , and find its surface area.**



Answer the following questions :

1 Choose the correct answer from those given :

1 If $a = b$, a, b are the measures of two complementary angles, then $a = \dots\dots\dots^\circ$

- (a) 30 (b) 45 (c) 60 (d) 90

2 If $\tan 3X = \sqrt{3}$, where X is the measure of an acute angle, then $X = \dots\dots\dots^\circ$

- (a) 10 (b) 20 (c) 30 (d) 60

3 The sum of measures of the interior angles of the quadrilateral equals $\dots\dots\dots^\circ$

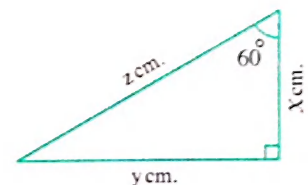
- (a) 360 (b) 180 (c) 90 (d) 540

4 If $A(1, -6)$, $B(9, 2)$, then the midpoint of \overline{AB} is $\dots\dots\dots$

- (a) $(-2, 5)$ (b) $(2, -5)$ (c) $(5, -2)$ (d) $(-5, 2)$

5 In the opposite figure :

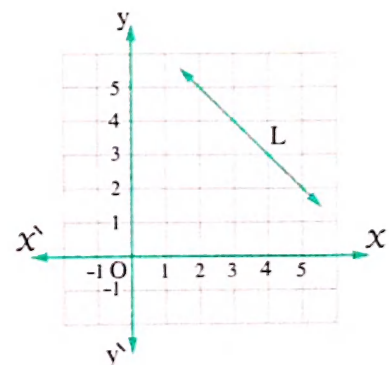
- (a) $X + y = z$ (b) $z = X^2 + y^2$
(c) $2X = z$ (d) $y = \frac{1}{2}z$



6 In the opposite figure :

L is a straight line passing through the two points $(2, 5)$, $(5, 2)$, then the point $\dots\dots\dots \in L$

- (a) $(1, 6)$ (b) $(2, 3)$
(c) $(0, 0)$ (d) $(3, -4)$



2 [a] Without using the calculator, prove that : $\sin 60^\circ = 2 \sin 30^\circ \cos 30^\circ$

[b] ABCD is a quadrilateral, where $A(2, 4)$, $B(-3, 0)$, $C(-7, 5)$, $D(-2, 9)$ prove that : ABCD is a square.

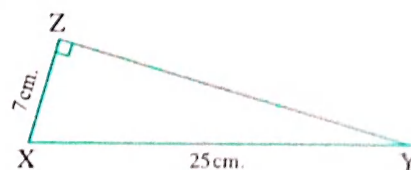
3 [a] Find the equation of the straight line whose slope is 3 and passes through the point $(5, 0)$

[b] In the opposite figure : XYZ is a right-angled triangle at Z

, $XZ = 7$ cm. , $XY = 25$ cm.

1 Find the value of : $\tan X \times \tan Y$

2 Prove that : $\sin^2 X + \sin^2 Y = 1$



4 [a] Without using the calculator , find the value of X if : $2 \sin X = \tan^2 60^\circ - 2 \tan 45^\circ$ where X is the measure of an acute angle.

[b] Prove that the points A $(-1, -4)$, B $(1, 0)$, C $(2, 2)$ are collinear.

5 [a] Prove that the straight line passing through the two points $(-3, -2)$, $(4, 5)$ is parallel to the straight line which makes with the positive direction of the X -axis an angle of measure 45°

[b] If the straight line passing through the two points $(-2, 3)$, $(1, k)$ is perpendicular to the straight line whose slope equals -3 , then find the value of k

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Red Sea Governorate



Answer the following questions :

1 Choose the correct answer from those given :

1 $2 \sin 30^\circ = \dots\dots\dots$

(a) $\frac{1}{2}$

(b) $\frac{\sqrt{3}}{2}$

(c) 1

(d) 2

2 The measure of the exterior angle of the equilateral triangle equals

(a) 30°

(b) 60°

(c) 90°

(d) 120°

3 The distance between the point $(3, 4)$ and the point of origin equals length units.

(a) 3

(b) 4

(c) 5

(d) 7

4 If 3 cm. , 7 cm. , l are the lengths of the sides of a triangle , then l can be equal to cm.

(a) 3

(b) 7

(c) 4

(d) 10

5 If $\overrightarrow{AB} \perp \overrightarrow{CD}$ and the slope of $\overrightarrow{AB} = \frac{2}{3}$, then the slope of $\overrightarrow{CD} = \dots\dots\dots$

(a) $\frac{2}{3}$

(b) $-\frac{2}{3}$

(c) $\frac{3}{2}$

(d) $-\frac{3}{2}$

6 The image of the point $(3, -2)$ by reflection in the origin point is

(a) $(-3, 2)$

(b) $(-3, -2)$

(c) $(3, 2)$

(d) $(-2, 3)$

2 [a] Find the value of : $\cos 60^\circ \sin 30^\circ - \sin 60^\circ \tan 60^\circ + \cos^2 30^\circ$

[b] Prove that the straight line which passes through the two points $(-3, -2)$, $(4, 5)$ is parallel to the straight line which makes an angle of measure 45° with the positive direction of the X -axis.

- 3 [a]** Find the slope of the straight line $3x + 4y - 5 = 0$, then find the length of the intercepted part from y-axis.

[b] Find the value of x where : $x \sin 30^\circ \cos^2 45^\circ = \sin^2 60^\circ$

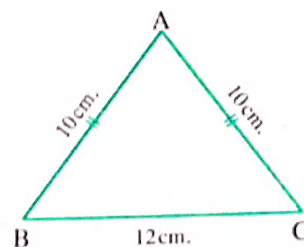
- 4 [a]** In the opposite figure :

ABC is a triangle in which $AB = AC = 10$ cm.

, $BC = 12$ cm.

1 Find : $m(\angle B)$

2 Prove that : $\sin^2 B + \cos^2 B = 1$



- [b]** Prove that the triangle whose vertices are $A(1, 4)$, $B(-1, -2)$, $C(2, -3)$ is right-angled, then find its area.

- 5 [a]** Find the equation of the straight line which passes through the point

$A(4, 6)$ and the midpoint of \overline{BC} where $B(3, 7)$, $C(1, -3)$

- [b]** ABCD is a parallelogram where $A(3, 3)$, $B(2, -2)$, $C(5, -1)$, M is the intersection point of its diagonals. **Find :**

1 The coordinates of M

2 The coordinates of D

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Matrouh Governorate



Answer the following questions : (Calculator is allowed)

- 1** Choose the correct answer from those given :

1 The area of the square whose perimeter is 16 cm. equals cm^2

(a) 4

(b) 8

(c) 16

(d) 256

2 The equation of the straight line whose slope is 1 and passes through the origin point is

(a) $x = 1$

(b) $y = 1$

(c) $y = x$

(d) $y = -x$

3 If $\cos 2x = \frac{1}{2}$, then $x = \dots\dots\dots$

(a) 15°

(b) 30°

(c) 45°

(d) 60°

4 A right circular cylinder, if its height equals the length of its base radius = r cm., then its volume = cm^3

(a) πr^3

(b) $2\pi r^2$

(c) $2\pi r^3$

(d) $\frac{4}{3}\pi r^3$

5 The slope of the straight line which is parallel to the x -axis is

(a) -1

(b) zero

(c) 1

(d) undefined.

6 In the opposite figure :

$$m(\angle C) = 120^\circ$$

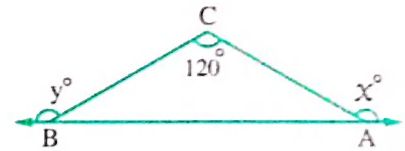
, then $x^\circ + y^\circ = \dots\dots\dots$

(a) 90°

(b) 180°

(c) 300°

(d) 360°



2 [a] Without using calculator , find the value of x if : $4x = \cos^2 30^\circ \tan^2 30^\circ \tan^2 45^\circ$

[b] \overline{AB} is a diameter of the circle M , if $B(8, 11)$, $M(5, 7)$

Find : **1** The coordinates of A

2 The length of the radius of the circle.

3 [a] Prove that the points $A(-2, 5)$, $B(3, 3)$, $C(-4, 2)$ are not collinear and if $D(-9, 4)$, prove that the figure $ABCD$ is a parallelogram.

[b] Explaining the steps and without using calculator , find :

$$\frac{\cos^2 60^\circ + \cos^2 30^\circ - \tan^2 45^\circ}{\sin 60^\circ \tan 60^\circ - \sin 30^\circ}$$

4 [a] Find the equation of the straight line which passes through the point $(3, 4)$ and is perpendicular to the straight line $5x - 2y + 7 = 0$

[b] $ABCD$ is an isosceles trapezoid , $\overline{AD} \parallel \overline{BC}$, $AD = 4 \text{ cm.}$, $AB = 5 \text{ cm.}$
where $BC = 12 \text{ cm.}$

Prove that : $\frac{5 \tan B \cos C}{\sin^2 C + \cos^2 C} = 3$

5 [a] If the straight line L_1 passes through the two points $(3, 1)$, $(2, k)$ and the straight line L_2 makes with the positive direction of the x -axis an angle whose measure is 45°
, then find k if the two straight lines L_1 , L_2 are :

1 Parallel.

2 Perpendicular.

[b] Find the slope and the intercepted part of y -axis by the straight line : $2x = 3y + 6$